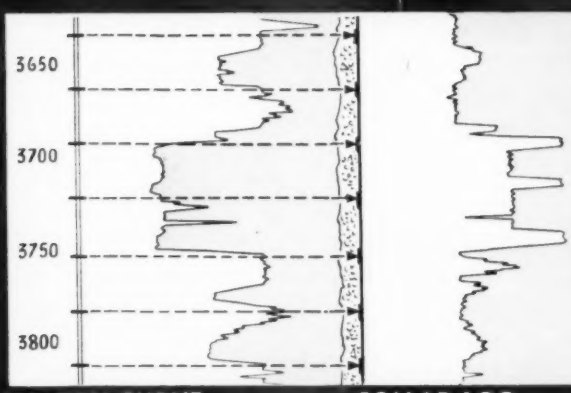
the OIL AND GAS JOURNAL

AR-203

We All Agree



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GAMMA RAY CURVE shows character and extent of all formations thru which the well passes!

COLLAR LOG at left ties formation to fixed, immovable reference points!

NEUTRON CURVE shows extent of all fluid in formations!

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PRICE 50 CENTS

TABLE OF CONTENTS PAGE 35

JUNE 30, 1949

Let's get back to fundamentals

THE PURPOSE OF A VALVE IS TO SHUT OFF A LINE

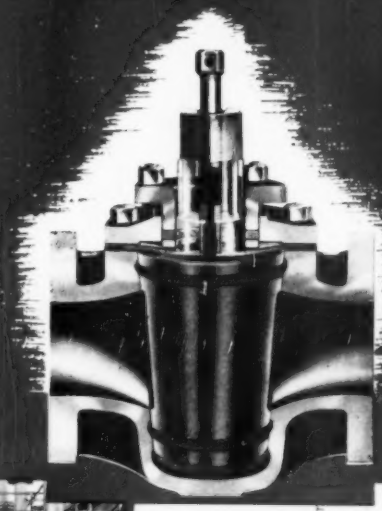
On the premise that a good valve should be a dependable shut-off first, last and always, how is this objective best accomplished?

You want a valve that is leak-resistant. Instead of depending upon the tightness of a wedged closure to block the line fluid, Nordstrom provides a pressurized plastic seal around each port, renewable at will by a few strokes of a grease-gun, or by turning a lubricant screw. It's that simple.

You want a valve that doesn't stick. Nordstrom makes every turn an easy one because the slideable surface of the tapered plug is lubricated and the plug is lubricant-jacked to keep it free-turning. Admittedly, a lubricated surface is superior to a dry metal-to-metal contact.

You want a valve that is long-lasting. Nordstrom prevents undue wear of seat by never exposing it to the line. Lubricant between plug and seat supplies a protective film.

Nordstrom valves Insure positive shut-off *in all phases of petroleum processing. Nordstrom valves stand up to extreme conditions such as hydrocarbons combined with high temperatures, corrosive chemicals and abrasives.*



Nordstrom

LUBRICATED VALVES

NORDSTROM VALVE DIVISION ROCKWELL **Rockwell Manufacturing Company**

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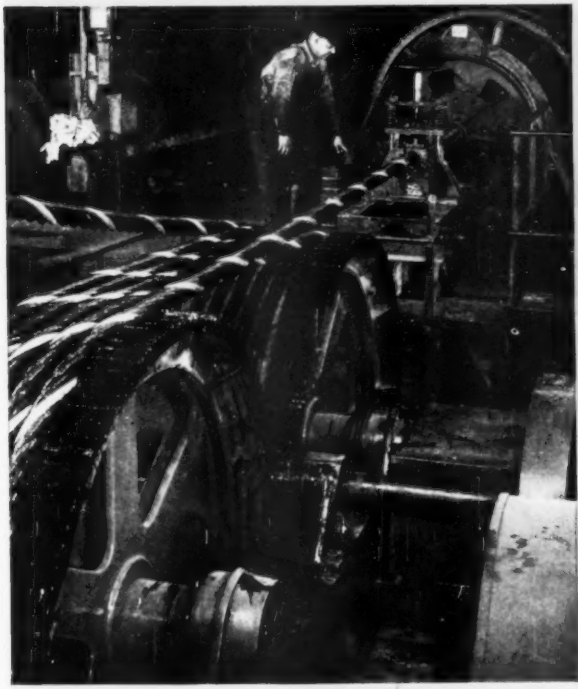
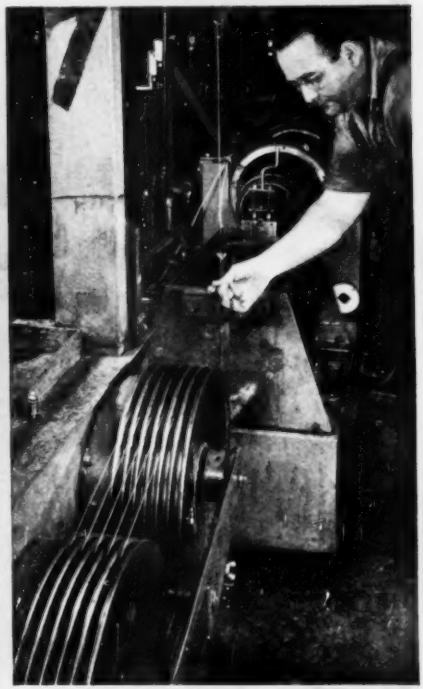
Export: Rockwell International Corporation, 7701 Empire State Bldg., New York 1, N. Y.

This photograph shows a 3⅛" diameter Monarch Whyte Strand Wire Rope coming off a Macwhyte closing machine. Weight of this rope is approximately 16.65 pounds per foot. It has a strength of approximately 392 tons and is used for the digging line on large dragline excavator with 35 cu. yd. bucket.



In this photograph is a 3/64" diameter Stainless Steel Cord coming off a Macwhyte closing machine. It weighs approximately 0.35 lbs. per 100 feet; has a strength of approximately 270 pounds, and is used for many small cord needs.



Whether you need

LARGE WIRE ROPE or SMALL WIRE CORD

make your selection from

You will get smoother operation and better service when you use the wire rope designed and manufactured to meet your requirements.

Macwhyte engineers are always glad to suggest the correct Macwhyte rope or cord best suited to your needs.

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2916 Fourteenth Avenue **Kenosha, Wisconsin**

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WIRE ROPES
made by
MACWHYTE

Willingness to work with foresighted engineers and operators in their plans for equipment to meet expected but-as-yet unexisting conditions . . . ability to design and produce that equipment . . . plus the reputation established through more than a decade of service . . . these are the reasons why W-K-M VALVES were specified on this immense Christmas Tree. It's the largest and heaviest ever built . . . designed for working pressures of 10,000 POUNDS PER SQUARE INCH!

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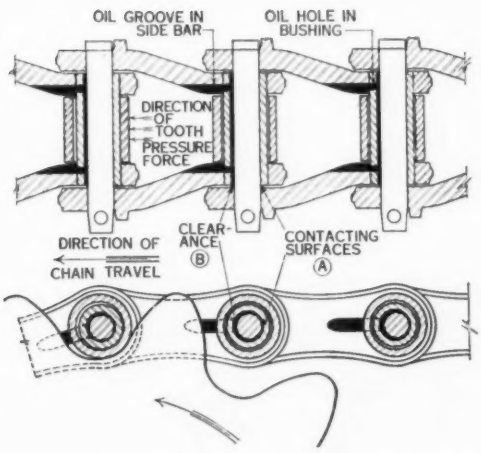
Here is WHY LINK-BELT API-4 Hyper Chain *Outlives other Drilling Chains*



Single link and cross-section drawing of Link-Belt API-4 Hyper Chain, with arrow to oil groove.

One of the secrets of a Link-Belt drilling chain's longer life is a small, insignificant-looking groove. You'll find this groove on the inside of each side-bar on every link of API-4 Hyper chain built by Link-Belt.

That tiny groove is mighty important—*and it's exclusive*—for it's patented by Link-Belt.

As API-4 Hyper drilling chain drives through the oil, the oil is literally scooped into that small groove . . . then flooded into the minute clearances between the *moving parts* of each link. Thus, Link-Belt chain *actually rides on a film of oil*—and continuously does it. Simple? Yes, but *exclusive* with Link-Belt—and worth remembering when you buy drilling chain again!

Which proves once more . . . it's the small, sometimes unnoticed things that Link-Belt does—which are just as important as the more obvious features—that build *longer life with less maintenance* into Link-Belt chains.

LINK-BELT COMPANY 11 433

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Overall length—95⅛"
Net weight—3,400 lbs.

R-430
120 TONS
R-330 — 90 TONS

MODEL R-430
4 sheaves, 30" dia.
Center pin—5⅜" dia.
Overall length—54¼"
Net weight—2,600 lbs.

MODEL R-330
3 sheaves, 30" dia.
Center pin—5⅜" dia.
Overall length—53½"
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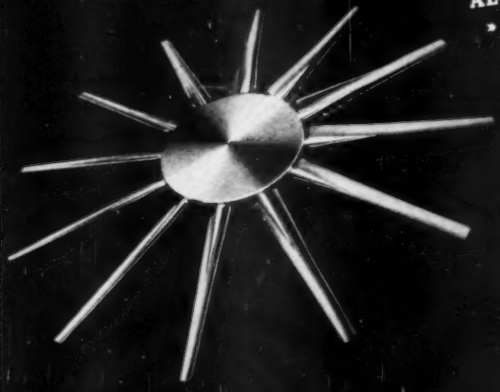
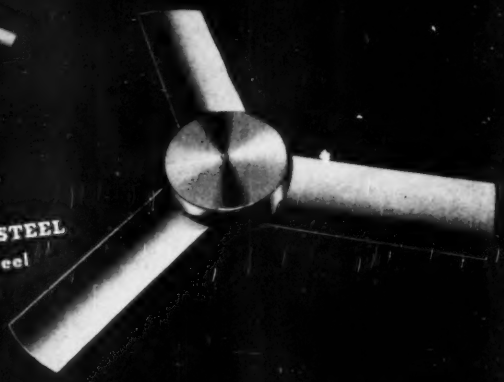
NEW Marley FANS For Cooling Towers and DriCooler* Do The Job Better . . . Longer



ALUMINUM
- » Multibladed » Balanced
- » Unusually quiet and smooth operation
- » High tensile cast aluminum alloy
- » Adjustable pitch » Air foil section
- » Twisted and tapered blades



STAINLESS STEEL
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- » Air foil section
- » Quiet and smooth operation

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- » Flared throat
- » Non-corrosive

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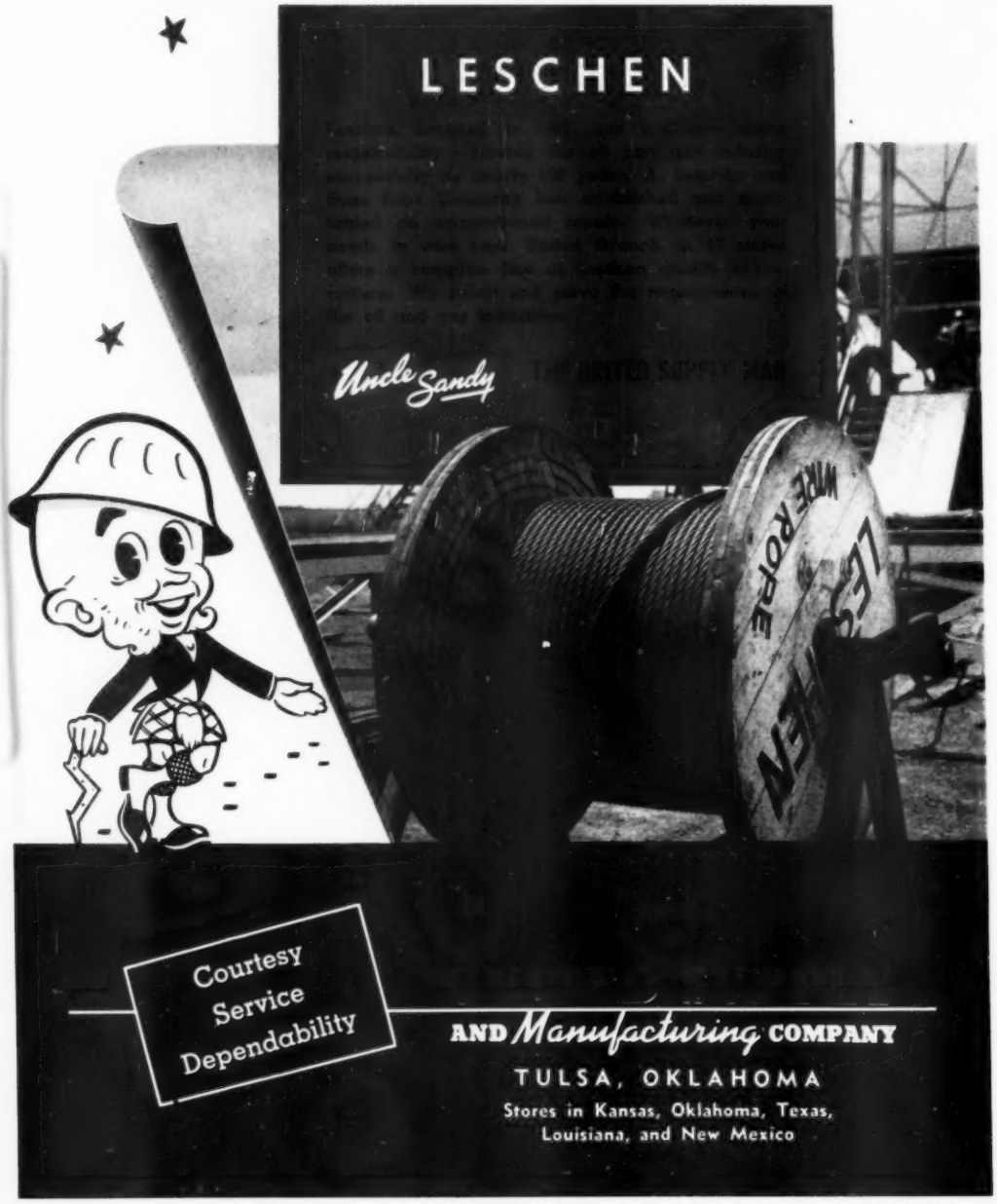

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2. Should surface choke damage or failure, line breaks, freeze-ups, etc., occur, spring-loaded pilots (which control the Surface Safety Valve closing mechanism) are actuated as pressure differential across the surface choke varies from a pre-determined range.

3. When fluid is exhausted through the pilots into the flow line at a point *downstream* from the surface choke, the gate is driven down from a fully-opened to a positive closed position, thus shutting off all flow through the line.

For complete information on the new Type XFG and all other standard Otis Surface Safety Valves, write Otis Pressure Control, Inc., Box 7206, Dallas, Texas.

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SURFACE SAFETY VALVE

(T-28)

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4. Regular inspection of sheaves to detect worn grooves.
5. Avoidance of overloads.
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3 Speed over 100-ft. unbanked circle!
4 Twist over ditches — 18 inches deep!
5 Drive up 6% grade thru 3-ft. of sand!
6 Climb 70% grade from dead stop!
7 Climb 8-in. beam from standstill!
8 Drill pole holes to prove equipment!
9 Speed safely over level highways!

This is FWD's proving ground. This is your assurance that the FWD you select has the stamina to insure long life without expensive mechanical breakdowns.

An FWD twists over 18-inch ditches on the proving ground. For all the facts, see your FWD distributor— or write FWD direct.

An Invitation To Truck Buyers

We invite you to watch FWDs pass a series of rigid performance tests. Ask your FWD distributor to arrange your visit to our plant. Or — if you can't get away, ask him to show you the movie, *The FWD Story*. In either case, you will see for yourself how FWD trucks can help solve your heavy-duty trucking problems.

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President
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FOUR AND SIX WHEEL DRIVE TRUCKS

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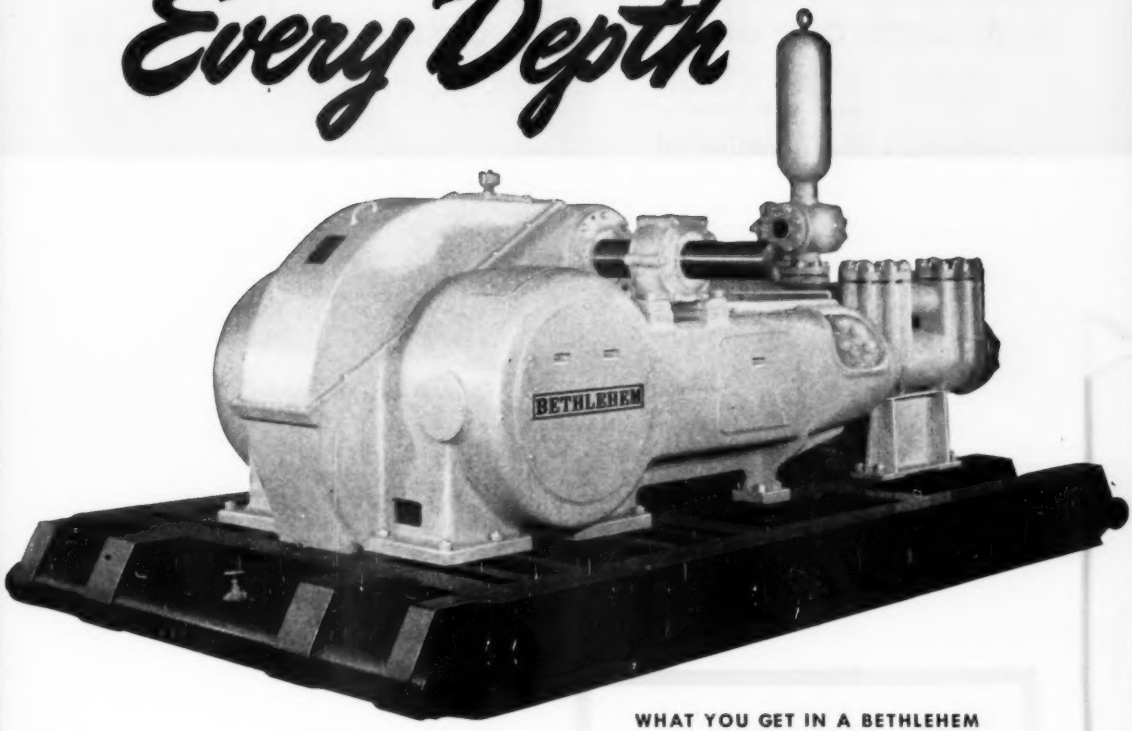
BETHLEHEM BUILDS A PUMP FOR *Every Depth*



Yes, and the rugged, foolproof features of the big G-600 are also included in the smaller units—those used for shallow and medium depths. So no matter what size Bethlehem pump you need, you're sure of getting *everything* a slush pump should have.

One example: Bethlehem's tri-phase lubrication, which eliminates compromise oiling. For the gear and pinion, a bath of oil; for the roller bearings, pressure grease; for the crosshead slides and guides, a force-feed system. Thus, every part requiring lubrication gets the type best suited to its needs. In a Bethlehem pump, hit-or-miss oiling simply doesn't exist.

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Forged, heat-treated alloy-steel shafts
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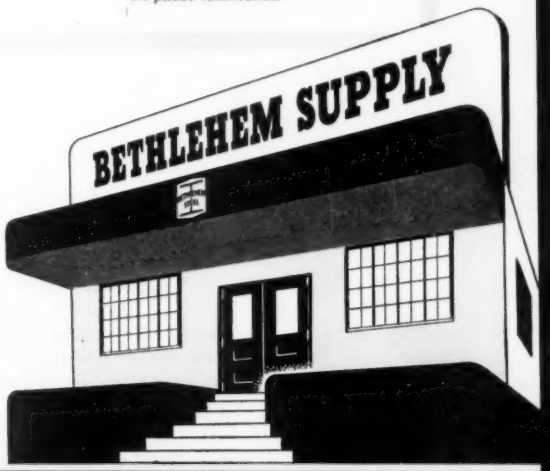
Renewable crosshead slides and guides
Screw-type stuffing-box glands
All-steel fluid end
Double-packed Flint-Hard liners
Built-in telltale holes
Tri-phase lubrication



BETHLEHEM SUPPLY COMPANY
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On the Pacific Coast Bethlehem Oil-Field Equipment is sold by Bethlehem Supply Company of California

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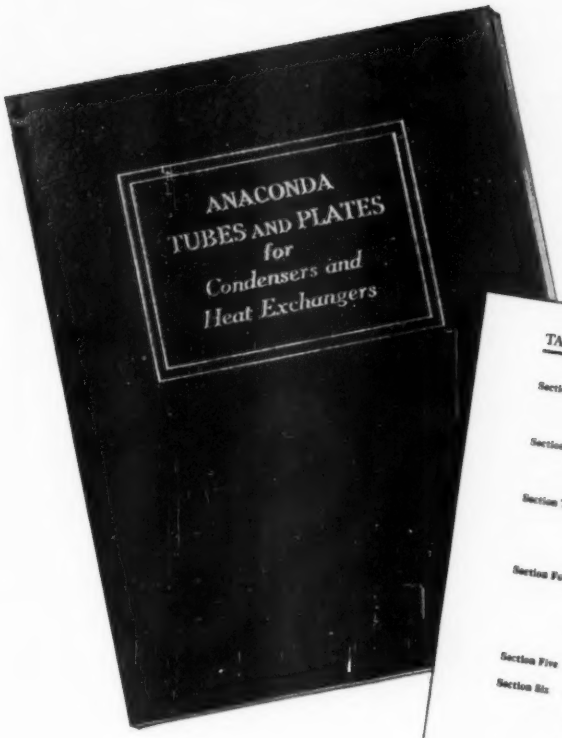
that's full of things you want to know...



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and up-to-date in all its seven sections, this

NEW, 7th EDITION

of Anaconda Publication B-2 is yours without cost or obligation.

49121

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Waterbury 88, Connecticut

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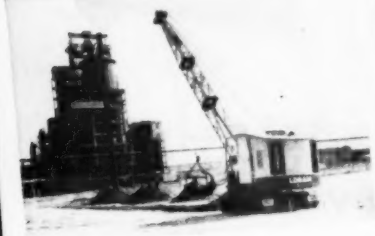
THEW-LORAIN is 50 years young!

1899 . . . First full revolving shovel as designed and built by Captain Richard Thew in 1895. After 4 years of operation as a private business, The Thew Shovel Co. was incorporated in 1899.



TODAY . . . The world's largest builder of commercial size shovels, cranes, clamshells, draglines and hoes, mounted on crawlers or rubber-tires, is identified by the trademark "Thew-Lorain."

50 years ago — July 17, 1899 — an idea became an industry — an industry still going strong today as The Thew Shovel Co. Thew alone hasn't made this anniversary possible. It's due largely to you and your repeated confidence in Thew-Lorain products. We're old only in our years of experience and "know-how" . . . but young as ever in our ideas and efforts to serve you better, today and tomorrow.

THE THEW SHOVEL CO., LORAIN, OHIO

THEW-LORAIN 1899 50th 1949 ANNIVERSARY

50 YEARS devoted exclusively to the design and manufacture of Power Shovels & Cranes.

THEW Lorain

CORROSION COSTS

$6,000,000,000.00

ANNUALLY!

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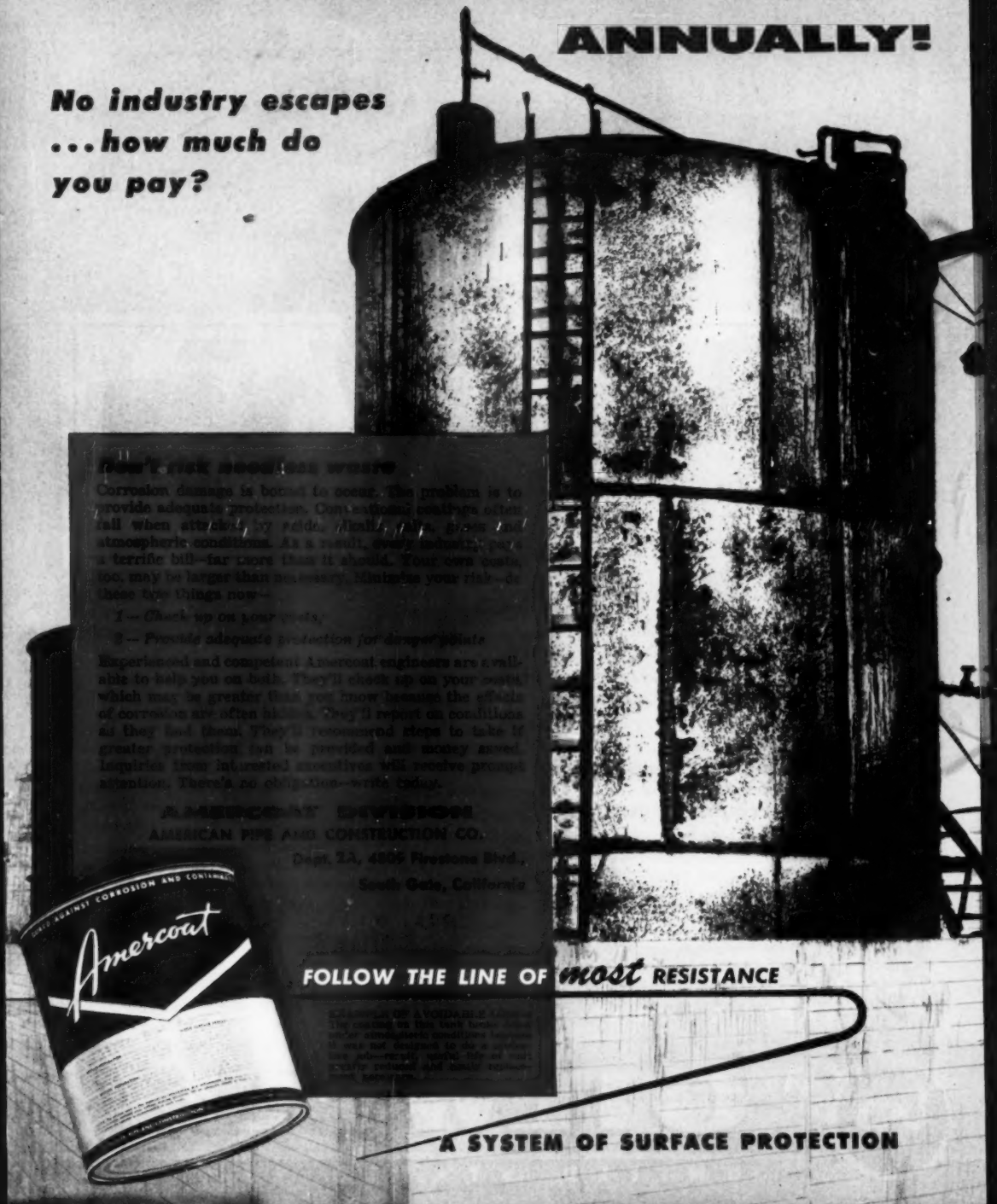


Don't risk needless waste

Corrosion damage is bound to occur. The problem is to provide adequate protection. Conventional coatings often fail when attacked by acids, alkalis, salts, gases and atmospheric conditions. As a result, every industry pays a terrific bill—far more than it should. Your own costs, too, may be larger than necessary. Minimize your risk—do these two things now—

1 — *Check up on your costs.*

2 — *Provide adequate protection for dependable*

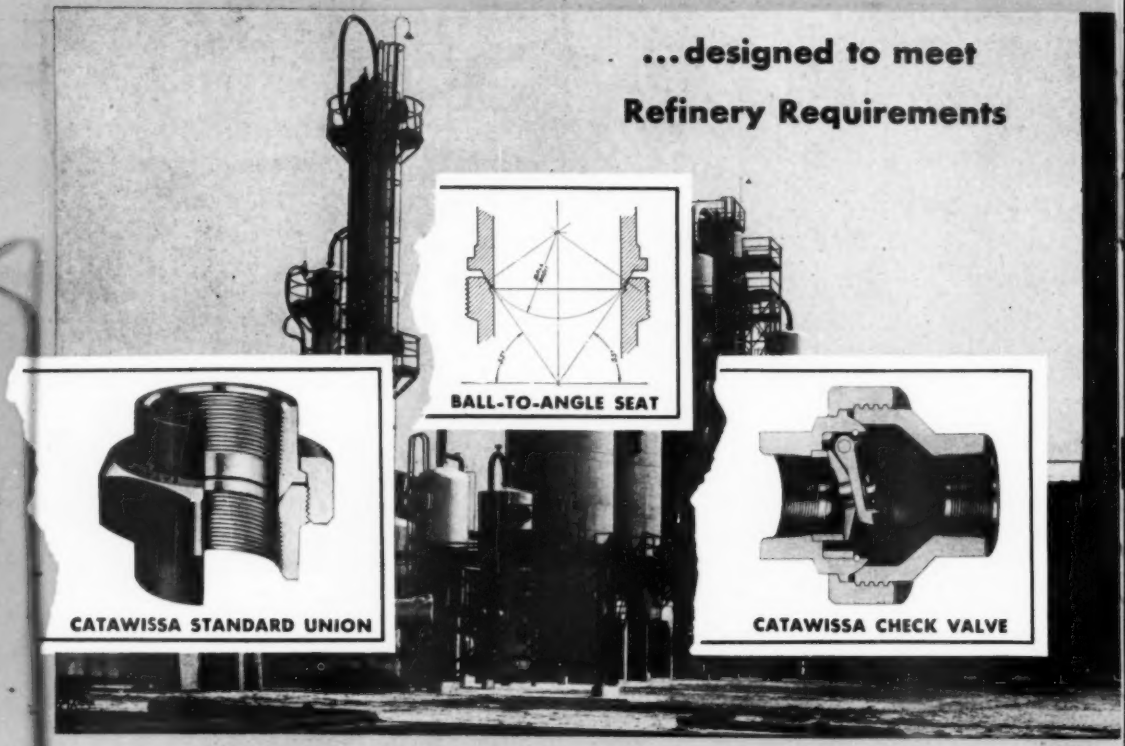
Experienced and competent Amercoat engineers are available to help you on both. They'll check up on your costs which may be greater than you know because the effects of corrosion are often hidden. They'll report on conditions as they find them. They'll recommend steps to take if greater protection can be provided and money saved. Inquiries from interested executives will receive prompt attention. There's no obligation—write today.

AMERICAN ENVIRONMENTS
AMERICAN PIPE AND CONSTRUCTION CO.
Dept. 2A, 4835 Firestone Blvd.,
South Gate, California

FOLLOW THE LINE OF *most* RESISTANCE

A SYSTEM OF SURFACE PROTECTION

Always specify "CATAWISSA" Unions and Check Valves



"OILWELL'S" strategically located refinery stock points carry complete lines of Catawissa forged-steel unions and check valves that meet the most severe refinery specifications.

CHECK THESE FEATURES

HOT-FORGED . . . from solid, rectangular steel bars, Catawissa Unions are free from sand and blow holes. They will expand and contract with the pipe, assuring tight joints.

THREADS—Catawissa Unions and Valves are supplied with either full ACME threads or U. S. Standard V-threads in the union nuts and on the female end.

SEATS . . . in all Catawissa Unions are a 55° angle on the female end to a BALL on the male end, assuring a perfect seal even when the pipe is not perfectly aligned. Carefully hand-ground seats which require no packing are inspected and tested under water to assure holding qualities.

Contact your nearest "Oilwell" representative—to assist you with your refinery problems.

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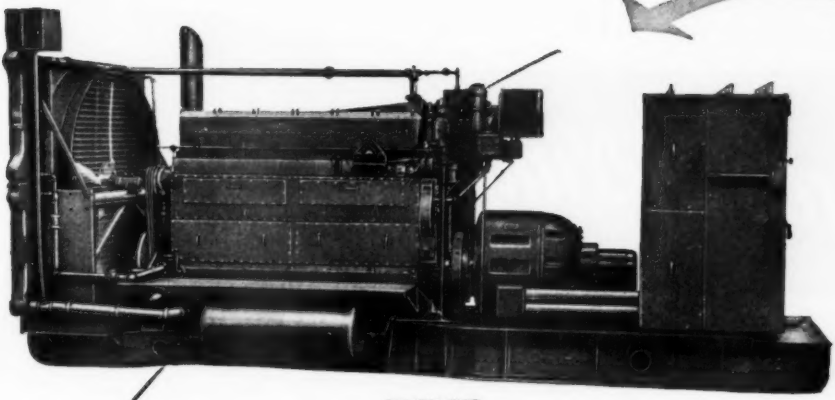
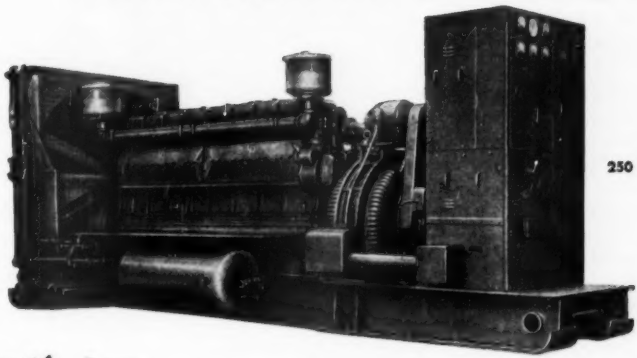
USS "OILWELL"

UNITED STATES STEEL



500 KW UNIT

At the very spot where power is needed



250 KW UNIT

EFFICIENCY PLUS ECONOMY

LOW FUEL CONSUMPTION results from efficient design of combustion chamber, valve mechanism and fuel injection system.

INSTANTANEOUS STARTING is assured by simple starting valve which admits air through distributor. The distributor, in turn, admits air at timed intervals to each cylinder.

DUST-TIGHT COVERS completely enclose all wearing parts, but are easily removed for inspection.

LUBRICATION is completely automatic force feed, resulting in exceptionally low maintenance.

EVERY PART is designed with ample strength for maximum rigidity with minimum weight assuring long service life.

CP PACKAGE UNITS . . . Diesel or Dual-Fuel Generator Sets . . . are another outstanding achievement of Chicago Pneumatic's thirty-four years' experience in engine building.

Designed to meet oil field needs for a complete, conveniently transportable source of power for remote locations. Easily installed, instantly started, these units are readily adaptable to every power requirement.

Furnished complete with piping, wiring, and all accessories . . . ready for operation . . . they can be set up quickly and easily . . . with minimum installation expense. Write today for complete information.

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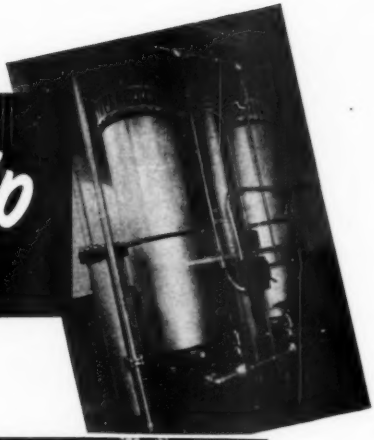
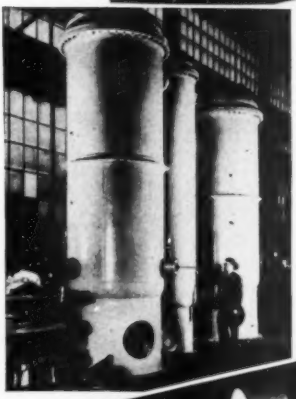
General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

Here's DRYing help



FOR PLANT DESIGNERS AND BUILDERS

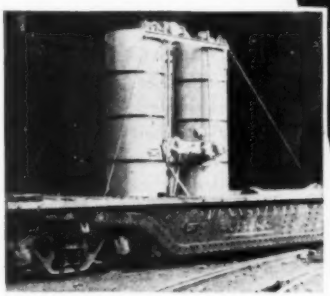


Do your processes call for DRYing operations? Just note the quantities involved, the dewpoints to be reached, and the materials to be handled—air, gases or organic liquids. Then get in touch with Lectrodryer for prompt recommendations on equipment to do that DRYing.

No need for your engineers to take time to design and supervise construction of special, untried machines. Quite often, the drier you need is a standard Lectrodryer, ready to step out of our catalog into your plant; special machines are "tailored" from time-proven parts. Thousands of Lectrodryers, in service all over the world, are evidence of their dependability.

Lectrodryer engineers have been assisting in solving DRYing problems ever since 1932. Draw on this wealth of experience whenever your design and construction work carries you into this very specialized field of dehydration by adsorption. We can probably save you money as well as time.

Send your inquiries and requests for our general catalog to Pittsburgh Lectrodryer Corporation, 325 32nd Street, Pittsburgh 30, Pennsylvania.



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HERE'S A MESSAGE TO EVERY MANUFACTURER WHO SUPPLIES EQUIPMENT TO THE PETROLEUM INDUSTRY

THE buyers' market is back. That is why you can't afford to overlook any advantage that steel can contribute in making your product more efficient, more durable, less costly to manufacture or easier to sell.

In recent years, new and finer steels have been developed. Faster and more efficient methods of applying steel have been discovered. New uses for steel, either alone or in combination with other materials, have been proved practical.

To bring you this information at first hand, to help you fit the *right* steel to your needs with the least trouble, waste and delay, the expert assistance of our metallurgical contact men is freely available. In addition to their intimate knowledge of the constantly changing steel picture, these men have behind them the facilities of the most completely equipped research laboratories and the finest steel making plants in America. They welcome the opportunity to serve you.

It will pay you to explore the possibilities of these Carnegie-Illinois Products

U·S·S CARILLOY STEELS:—All alloy grades, open hearth or electric furnace; in bars and small shapes, billets, blooms, slabs, forgings, plates, hot and cold rolled sheets, hot rolled strip, structural sections.

U·S·S HIGH STRENGTH STEELS:—U·S·S Cor-Ten, U·S·S Man-Ten, U·S·S Manganese-Nickel-Copper, —in bars and small shapes, tube rounds, plates, structural shapes, cold formed sections, hot and cold rolled sheets, and hot rolled strip.

U·S·S STAINLESS AND HEAT-RESISTING STEELS:—All grades and commercial finishes, in bars and small shapes, tube rounds, semi-finished, forgings, plates, structural shapes, hot and cold rolled strip.

CARBON STEEL:—In axles, bars, small shapes, forgings, plates, rails and track material; semi-finished (including ingots, blooms, billets, slabs, skelp, die-rolled crankshaft blanks, tube rounds); sheets (including cold rolled, galvanized, corrugated, bonded, galvannealed, hot rolled, electrical, copper-bearing, long terne, tack plate, enameling); hot rolled strip; structural sections; Multigrip flooring; bearing piles; steel sheet piling.

USS

CARNEGIE-ILLINOIS STEEL CORPORATION

PITTSBURGH · CHICAGO

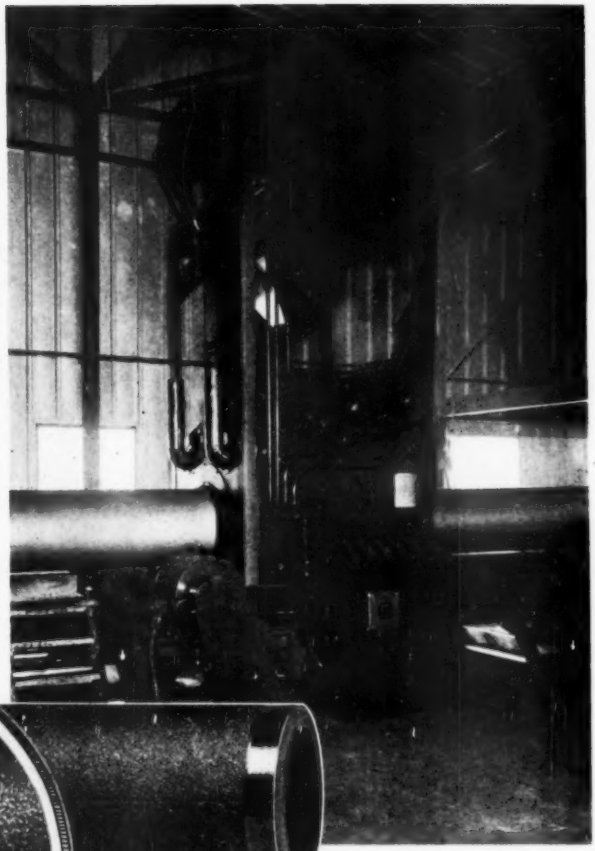
UNITED STATES STEEL

HILL, HUBBELL

Announces another great advancement for Factory applied pipe protection

ROTO-BLAST

ETCHED PIPE CLEANING WITH ANGULAR STEEL GRITS



ROTO-BLAST is the new highly mechanized pipe cleaning process; angular steel grits are hurled with great force against the warm and dried pipe which positively removes all rust, mill scale and foreign matter, and etches the surface of the pipe preparatory to priming and coating. The primer and coating-and-wrapping subsequently applied over **ROTO-BLAST** pipe surfaces not only covers but also penetrates and keys into the roughened or etched pipe surface assuring the perfect bond of coating-and-wrapping to the pipe.

HILL, HUBBELL PIONEERED INDOOR APPLIED PIPE PROTECTION . . . HILL HUBBELL leads the way to BETTER pipe protection.

Write, wire or phone for information on HILL, HUBBELL coating-and-wrapping process.

Hill, Hubbell and Company

Division of GENERAL PAINT CORPORATION

3091 MAYFIELD RD. CLEVELAND, OHIO.

DON'T LET DIRT PUSH YOU AROUND

Use BUCYRUS-ERIE BULLGRADERS *and* BULLDOZERS

YOU'RE always a step ahead of dirt moving problems with Bucyrus-Eries — the important step that gets drilling and production off to a fast start. Bucyrus-Eries move dirt faster and stay on the job longer because, from the start, they're engineered for perfect teaming with International Crawler tractors. It's a combination that saves time and money because it does everything right!

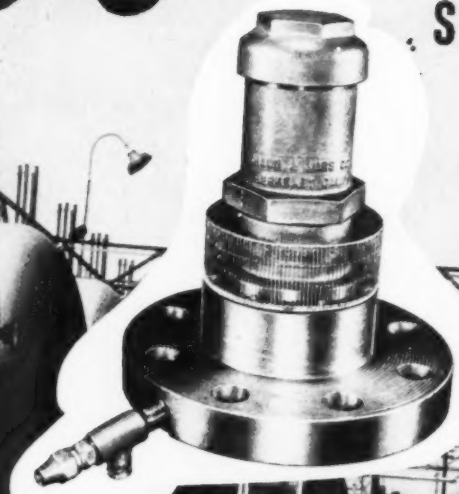
Ask your International Industrial Tractor distributor for complete details on these Bucyrus-Eries: Hydraulic Bullgraders (with quick blade-angling and tilting feature) and Bulldozers for TD-6, TD-9, TD-14, and TD-18 tractors; Cable-operated Bullgraders and Bulldozers for TD-14, TD-18, and TD-24 tractors. Bucyrus-Erie Company, South Milwaukee, Wisconsin.

108T48

See Your INTERNATIONAL Industrial Tractor Distributor

S&J Internal Safety Valves

PROTECT L.P. GAS STORAGE TANKS



S. & J. Hydraulic Internal Safety Valves are used in the L.P. Gas industry to give maximum protection to both delivery equipment and storage tanks. The valves are installed inside truck tank compartments and inside storage tanks. They are opened by hydraulic pressure. One valve is installed in the vapor line to equalize the pressure between two pressure vessels. Another is installed in the product delivery line. Both valves open simultaneously. Fusible plugs are installed in the hydraulic lines which actuate the safety valves. Should a fire occur while the valves are open, the fusible plugs melt and release the hydraulic pressure and the valves close automatically. A physical accident which tore away delivery and hydraulic lines would likewise release hydraulic pressure and close the valves instantly. We would gladly send you complete details on our L.P. Gas safety equipment.

SHAND & JURS CO.

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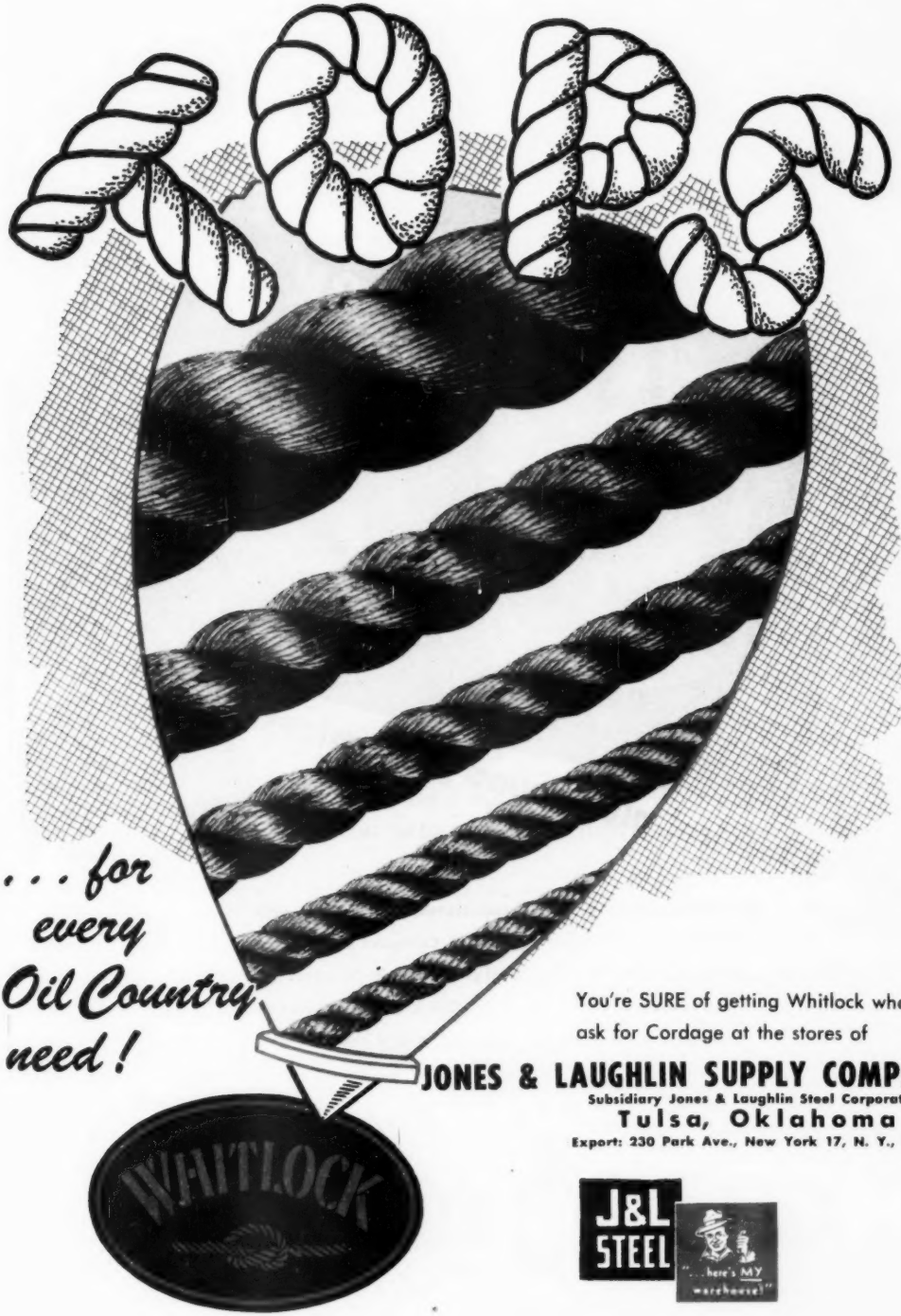


. . . for every Oil Country need!

You're SURE of getting Whitlock when you ask for Cordage at the stores of

JONES & LAUGHLIN SUPPLY COMPANY

Subsidiary Jones & Laughlin Steel Corporation

Tulsa, Oklahoma

Export: 230 Park Ave., New York 17, N. Y., U.S.A.

J&L STEEL

"...here's MY warehouse!"

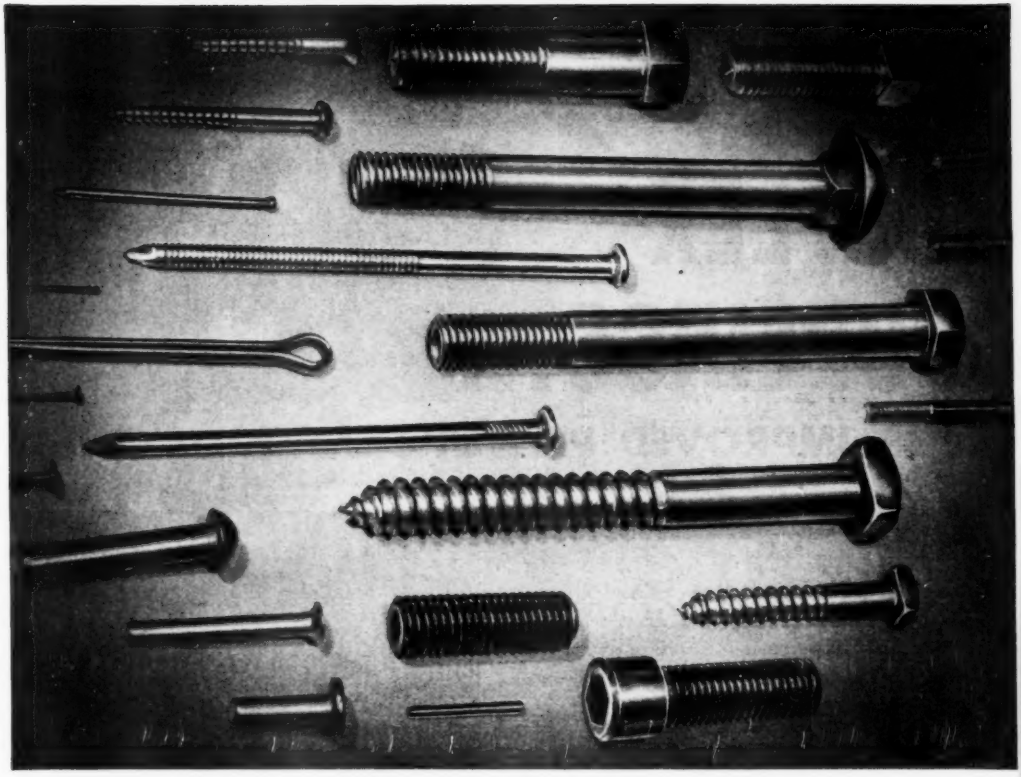
For abrasive ladings a.c.f. Lubricated Plug Valves with clear full circular ports* are ideal. Compact size is retained only through cylindrical plug design...straight-through flow with same shape and cross section as the pipe. Quick quarter turn to open or close...no exposed seats. For every reason a.c.f. Valves should be your first choice.

*Also offered with full area rectangular ports.

a.c.f. CYLINDRICAL FULL PIPE AREA LUBRICATED **PLUG VALVES**

Representatives in more than 50 principal cities.

Ask for catalog 4-OG. American Car and Foundry Company, Valve Division, 30 Church Street, New York 8, New York.



24 Ways to Be Safe Instead of Sorry!

HOW MANY PLACES IN YOUR PLANT OR PRODUCT DO YOU NEED THE PROTECTION OF MONEL FASTENINGS?

How a Transit Company Put Monel Fastenings to Work

Perhaps you have to take off your auto license plates only once a year. But chances are it's a job you hate to tackle because the nuts and bolts have been "frozen tight" by rust.

A bus company has to do that job on scores of buses. But it's not a tough job to one company we know. This company uses *Monel* nuts, bolts and washers to mount their plates. They never have a bit of trouble. And those Monel fastenings will outlast any vehicle.

Outdoors or indoors . . . in water or in corrosive fumes... *Monel** fastenings will be on the job long after ordinary fastenings have failed.

Why? Because Monel fastenings give you extra protection against rust . . . corrosion . . . overstressing . . . shock . . . vibration . . . heat . . . cold.

Take corrosion. You get broad protection with Monel. It resists alkalies, salts and most acids. It's 100% rustproof.

Take mechanical properties. Monel offers plenty of "extras." Compared to the free-cutting steel used in ordinary fastenings, Monel is 20% stronger. . . . 30% more ductile . . . 40% tougher.

Take extreme temperatures. You have no worry there. For Monel fastenings are safe at high heat or subzero cold.

And did you know this? *Any* type fastening you need is available in longer-lasting Monel.

Surely, there are many places in your plant or product where you want *(and need)* the extra advantages of Monel fastenings.

TEST A MONEL FASTENING, FREE! Write to Bob Johnson of Inco. Tell him your problem and the type and size you need. He'll send a sample . . . plus the address of your nearest supplier.

EMBLEM OF SERVICE INCO

THE INTERNATIONAL NICKEL COMPANY, INC.

67 Wall Street, New York 5, N. Y.

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Monel Fastenings are stronger... tougher... safer

MORSE MORFLEX COUPLINGS...

...FOR IMPROVED POWER TRANSMISSION

MORSE MORFLEX COUPLINGS improve power transmission in oil field equipment.

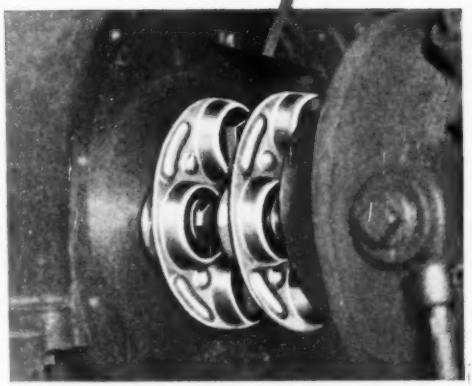
One of the famous line of Morse mechanical power transmission products, the Morflex has a reputation among petroleum equipment manufacturers for top performance under any and all oil field conditions.

Morflex Couplings are torsionally flexible. Misalignment and load fluctuations are taken up by the elastic deflection of the rubber biscuit in the exclusive center member assembly. The result is smooth, vibration-free power transmission.

There is no metal-to-metal contact—no moving parts to wear. No maintenance is required. Water, dirt, oil and adverse weather conditions will not affect its dependable operation.

The best oil field equipment made—your equipment—deserves the best coupling available—the Morse Morflex Coupling. Write for catalog C41-43. Morse Chain Company, Dept. 341, Detroit 8, Michigan.

BRANCH OFFICE AND WAREHOUSE, 1308 LA BRANCH, HOUSTON, TEXAS



In this portable pipe line pumping unit, a 702 CC Morflex couples the prime mover (a Chrysler eight-cylinder engine without clutch or transmission) to a 2-stage Byron-Jackson centrifugal pump.

Morflex Radial Coupling — recommended for heavy-duty applications subject to torque loads, shock, or high-frequency load reversals.

Silent Chain Drives

MORSE

MECHANICAL *POWER TRANSMISSION* PRODUCTS

A PRODUCT OF B-W BORG-WARNER

Roller Chain Drives

Morse-Formsprag Clutch

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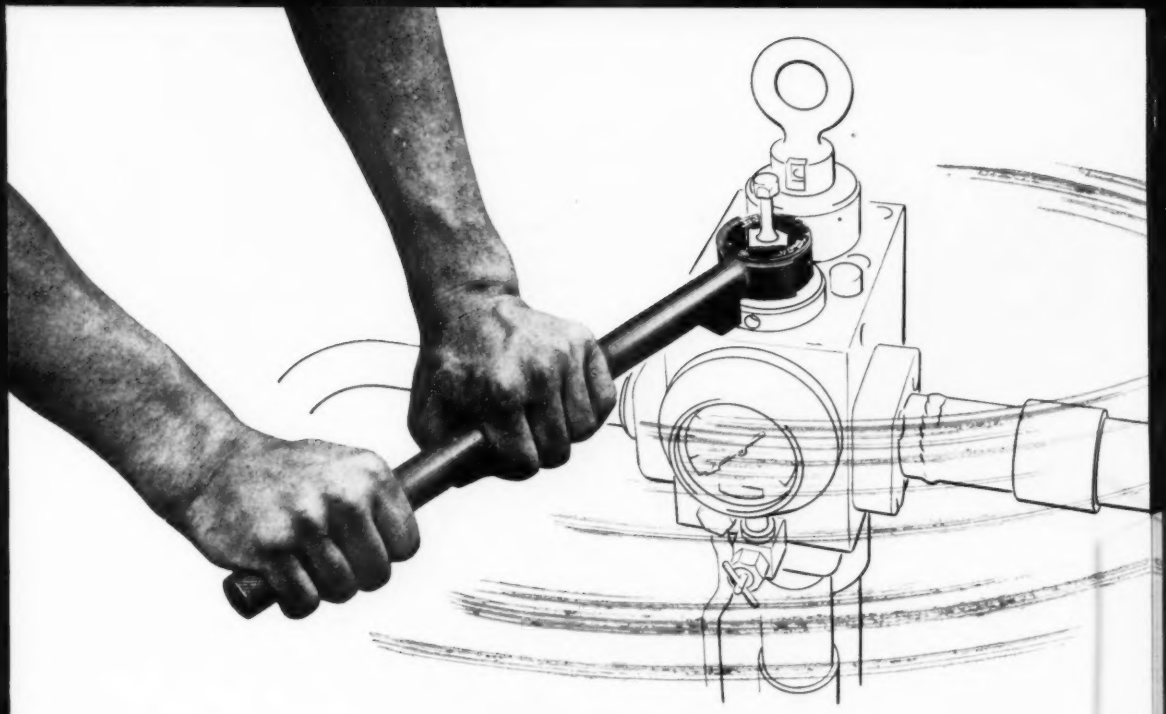
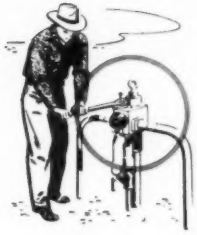


IS YOUR *Pulling Unit* HANDY?



When it is necessary to pull your well, do you have to wait days for service equipment to reach you? Have you figured how much oil you lose just waiting for a pulling rig?

If you have, you'll appreciate the advantages enjoyed by the *Free Pump* operator. His *pulling unit* is always handy. It's right at the wellhead. A turn of the 4-Way Valve handle is all that is needed to surface the bottom hole pump from any depth. It is seated the same easy way.

With *Free Pumping*, there's no waiting for equipment. No pulling expense. No rigging up or tearing down time. Your well is off production only the short time it takes to circulate the *Free Pump* in and out of the well.

Your lease is made independent of uncontrollable factors ...the weather...condition of the roads...availability of equipment.

Eliminate the delays...the waiting...the lost production ...the unnecessary down-time. Keep your *pulling unit* handy by changing to *Free Pumping*. Your local Kobe representative has some interesting figures on the saving you can make when you switch to *Free Pumping*. Call him tomorrow.

Free Pump

KOBE

ONE OF THE DRESSER INDUSTRIES

KOBE Inc. *General Offices:* Huntington Park, Calif. • *Division and District Offices:* Avenal, Bakersfield and Ventura, Calif.; Vernal, Utah; Oklahoma City and Tulsa, Okla.; Brownfield, Corpus Christi, Dallas, Houston, Longview, Odessa and Wichita Falls, Texas; Natchez, Miss.; Hobbs, N. M.; Great Bend, Kan.; New York.

THESE ARE THE DAYS OF FREE PUMPING

No "Weak Links" in Rex Oil Field Chains

Every link in every strand of Rex Oil Field Chain is designed and built for strength and service. Just look at these husky chains and check their outstanding features:

* **All parts made of carefully selected alloy steels accurately heat-treated for maximum strength and wear-resistance.**
* **Pins and bushings hardened and ground to close tolerances for precise fit and long wearing life.**
* **The Rex Unit-Link. All parts assembled by carefully controlled pressures to assure balanced force fits . . . put together to stay.**
* **Side bar holes machine-finished for accurate pitch . . . and to assure full bearing between parts.**
* **Effective lubrication system that puts the oil where it is needed.**

Add them all up and you'll see why Rex Oil Field Chains will last longer . . . give you more for your drilling dollar. Your Rex Field Engineer or local supply store will be glad to show you the many plus advantages you get with Rex Chains. Or, if you prefer, write to Chain Belt Company, 1619 West Bruce Street, Milwaukee 4, Wis.

CHAIN BELT REX COMPANY

REX OIL FIELD CHAINS

the chains that have grown up with the oil fields

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JOURNALLY Speaking

"Louisiana Story"

NOT long ago we gave a plug to the movie "Tulsa," a rip-snorting melodrama of the rough-and-tumble days of the oil industry 30 years ago.

We now want to put in a plug for an entirely different type of movie about an entirely different type of oil industry. "Louisiana Story" shows how the modern wildcatter comes to a new area peacefully and leaves the natives with a higher standard of living.

It was filmed entirely in the bayous of southern Louisiana, and there is not a Hollywood scene nor a professional actor in it. The only characters are a Cajun trapper and his barefoot son, an oil derrick and the driller, a pet coon and a predatory alligator. The theme is so simple that there is no plot. The only excitement is when the boy finally catches the alligator and when the well runs wild for a couple of days—and that is an actual filming of a well which blew out right where the movie crew was working.

The most remarkable thing is how the producer caught the noise of the drilling rig and blended it with the natural sounds and silences of the marshlands to make a real musical symphony. All there is to "Louisiana Story" is a documentation of life in the bayous and the operation of moving in a drilling barge, completing a well, and moving out. That's all. But it's so well done that it can't fail to have a special appeal to anyone who has seen a bayou or a drilling rig.

Dry-Hole Penalty

A RECENT dispatch from Moscow states that I. I. Malyshev has been relieved as Soviet minister of geology.

No explanation was given, but similar changes in soviet officialdom offer some clues. Most probably the Politburo had decreed that he was to find so many million barrels of new reserves by a certain date, and when he failed it was Siberia for him. Or perhaps the unfortunate Malyshev adhered to some degenerate capitalistic doctrine about the occurrence and location of petroliferous rocks and sabotaged soviet science by drilling dusters where Comrade Commissar told him to find oil.

Even under our free-enterprise system the life of a chief geologist is full of hazards and disappointments, but we believe most of them would prefer to risk the company's money than the government's reputation and their own necks when staking a well location.

No Gravy

THE spectacular features of radar cooking have become less awe-inspiring to commercial cooking people than they were a year and a half ago, says the American Gas Association, but it reports with a worried air that radar still looms as a possible cooking competitor if the electronics wizards can find some way to make it brown the meat.

We suggest the problem be called to the attention of the Federal Power Commission, which is anxious to broaden its jurisdiction to cover every phase of the gas industry. This would bring FPC into conflict with the Federal Communications Commission, heretofore sole proprietor of all radio waves and the like, and the resulting interagency feud might make FPC forget about going after independent producers of natural gas.

Dirty Pun

NO alleged pun which has ever appeared in this department has even approached the one which headed a news release from Monsanto Chemical Co. We quote: "Johnny's Ears Clean? Isotope So."

The company, it says, has developed a means of mixing atomic energy with dirt, washing it off, and measuring how much is left with a Geiger counter "more sensitive than a mother's vigilant eye."

What we really need is a gagger counter to gag such gags.

—Henry D. Ralph

There can be *NO MISTAKE* in reading LIQUID LEVEL . . .

when you use

PENBERTHY Reflex GAGES

The refraction of light (an unvarying law of nature) makes the reading of Penberthy Reflex Gages unmistakable. Due to this refraction principle, the empty space always shows white—the space occupied by liquid always shows black. The dividing line between liquid and empty space is sharp and unmistakable, there can be no error in reading. It is easily read as far as you can distinguish between black and white.

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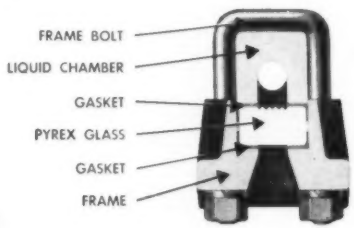

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VOL. 48. NO. 8 JUNE 30, 1949

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The Why of Curtailments

SOME observers are wondering how refiners are able to take care of current petroleum demands, with crude runs to stills 400,000 to 500,000 bbl. less than they were during the comparable period of last year. They have the same reaction when they compare present domestic crude-oil output with that of a year ago.

A complete explanation of this development would require a detailed analysis of several situations in this world adjustment period within petroleum operations. But the effects as reflected in current operations are readily apparent and understandable.

As was pointed out on this page in 1947 and 1948, the postwar period in which petroleum operations were largely dominated by fuel oil rather than gasoline requirements was certain to be temporary. The transition back to gasoline as the "money" product of this industry has been about completed.

The average yield of gasoline in April, according to the latest report of the Bureau of Mines, was 44.1 per cent, an increase of 3.9 per cent compared to April last year. To some this may appear to represent a minor shift in domestic operations, but it is not.

With this 44.1 per cent yield refiners were able to secure all the gasoline they needed from crude runs to stills averaging 5,141,000 bbl. daily in April. Had their yields been the same as in April 1948 it would have been necessary to process 5,674,000 bbl. of crude oil daily.

Thus refiners in this country were able to reduce the crude-oil requirements by 533,000 bbl. daily simply by changing their plant processing so that gasoline yields were about the same as they were in the prewar year of 1939. This was accomplished by reducing recoveries of other products, principally distillate and fuel oil.

The large production of fuel products through the latter part of last year and early 1949, plus the fact that actual consumption was less than expected, added materially to inventories and lowered prices. As a consequence refiners as a group in recent weeks have found it expedient to return to the gasoline yields of 8 to 10 years ago.

Distillate yields are less than they were a year ago but are substantially greater than they were prewar, and because of the large new demands it will be necessary to maintain yields near present levels. The logical method to accomplish this is through further reductions in the yields of residual fuel oil which have been the weakest product on the refinery list for nearly a year. Additional processing equipment to accomplish this objective is an immediate need of many refiners.

The point here is that in practically all oil markets the tail has ceased to wag the dog. Once the several operating adjustments now under way have been completed, oil activities will again revolve around gasoline as the guide to all oil operations.

Ball Describes Mexican Loan As Disservice to Both Nations

by Bertram F. Linz

WASHINGTON.—The United States should advance no money to Mexico for exploration and development of her oil resources by Petroleos Mexicanos because "the chance is too slim that a monopoly would find and develop the oil of an area with Mexico's geology," the State Department has been told by Max W. Ball, former director of the Oil and Gas Division.

At the same time, Ball said in a letter to Robert H. S. Eakens, chief of the State Department's petroleum division, a loan for modernization and expansion of Mexico's refining and distribution facilities without definite assurance of an open door for competitive development of her oil resources by enough foreign companies to do the job properly would be "a disservice to both countries."

Ball estimated it would cost between $2,000,000,000 and $4,000,000,000 to develop Mexico's oil adequately and placed the reserves that might be found at 5,000,000,000 to 15,000,000,000 bbl. Canada offers more alluring possibilities of up to 20,000,000,000 bbl. without the hampering restrictions on private operation inherent in the Mexican constitution and laws, he said.

Must Open Doors

While he conceded the United States has no right to tell Mexico what economic policy she should follow, Ball emphasized that the Washington Government does have the right to decide whether a proposed loan is good or bad, "and not to make it if we do not think it is good." And unless Mexico, on her own initiative, opens her doors to competitive development on terms that would insure the entry of more than the few organizations with which agreements have been reached so far, no loan, even if only for improvement and expansion of facilities, would be good.

Ball, now engaged in oil and gas consultation in Washington, expressed his views as an individual, since the State Department has vetoed a suggestion made last April by E. E. Pyles of the Jergins Oil Co., Long Beach, Calif., that the proposed loan to Mexico should be considered by the National Petroleum Council.

Through the Oil and Gas Division, then headed by Robert E. Friedman, the department held that NPC consideration of a specific loan, for which State had the basic responsibility, would be "inappropriate," but it invited council members and members of the industry generally to submit their views as individuals.

There are indications that a not inconsiderable opposition is being raised against the loan, based on the premise that unless Mexico revises her policies Petroleos Mexicanos can not be successful in developing the oil resources of the country. In many quarters, Ball is seen as having competently summed up views which are entertained generally throughout the industry.

Ball pointed out that Mexican oil development has been almost at a standstill for the past decade, during which, to keep pace with comparable areas in the United States, 500 to 1,000 wells per year should have been drilled instead of the actual average of 35 a year.

Adequate development of the country's potential capacity during the next 10 years, he said, would depend on the number and character of the new fields found, but would probably require at least 10,000 wells and might take double that number or more. The drilling of even the lesser number, he estimated, would cost from $1,000,000,000 to $2,000,000,000, depending on location, depth, and prices for labor and material, and an additional similar sum for field equipment, pipe lines, etc.

"The Government of the United States can not afford to lend Mexico $2,000,000,000 to $4,000,000,000 for exploration and development," Ball declared. "She does not lend to her own citizens for such purposes. If she were in the habit of making loans for exploration, the amount required is too large, and the loan would not be good. The chance is too slim that a monopoly would find and develop the oil of an area with Mexico's geology.

No Reflection on Pemex

"This is no reflection on Mexico or on Pemex," added. "It would hold if the monopoly were run by the United States Government or by an American oil company."

Ball told Eakens that an adequate oil supply in the Western Hemisphere may be vital to the defense of the United States and that hemisphere, and should be big enough to fuel a war, if war should come.

"It is not vital, however, that the additional supply be in any particular country, not even Mexico, our closest neighbor on the south," he said.

"Canada, our neighbor on the north, offers more alluring prospects, geologically and politically, than Mexico."

The Alberta Syncline, Ball declared, may well contain 20,000,000,000 bbl. or more.

But even though not vital, he continued, additional productive capacity in Mexico is important to the United States and to hemisphere defense, and an exportable surplus from Mexico would be an asset in war but a petroleum-deficient Mexico would be a liability.

Mexico doubtless has undiscovered reserves of considerable magnitude, probably between 5,000,000,000 and 15,000,000,000 bbl., but finding and developing those reserves will not be easy, Ball pointed out. Most of the possible areas are unexplored for oil, or at best only slightly explored; the geology of the country is rather complex, not of the type that promises quick and easy discoveries, and finding new oil in Mexico will not be like finding new oil in the Middle East or even in Venezuela.

Competition Essential

"Under such geologic conditions, finding the unfound oil is not a job for a monopoly, whether state or private," Ball warned. "The job calls for the interplay of a wide diversity of individual judgments; for this man to drill what that one has turned down. It can not be done successfully, in my opinion, except by competitive exploration, on terms offering adequate incentives for the cost and risk involved."

In addition to billions for exploration and development, Mexico needs $20,000,000 to $50,000,000 to modernize her present refineries, build new ones, and provide better internal distribution of refined products. She would not be justified in spending that money without more crude production, Ball said, and if she develops still more crude productive capacity her need for refining and distribution facilities will be correspondingly greater.

"The United States could afford to lend Mexico $20,000,000 to $50,000,000 for refining and distribution facilities adequate for her domestic needs, provided the facilities were to be backed by adequate crude-oil production," he held. "Without such adequate production the loan would not be good and should not be made.

"Neither the interest of Mexico nor our own would be served by a poor loan. It would be unfair to the American taxpayer, whose money would be jeopardized, if not wasted. It would be unfair to Mexico, whose indebtedness would be increased without reasonable chance of repayment."

Discussing the exploratory and development angle, Ball pointed out that the only probable source of financing on the scale required for Mexican

(Continued on page 125)

Amendments to Gas Act Move Ahead in Both Senate, House

WASHINGTON.—Legislation to exempt producers and gatherers of natural gas from Federal Power Commission control moved ahead last week on both sides of the Capitol.

The House interstate commerce subcommittee, under Rep. Oren Harris of Arkansas, sent a bill along to the full committee, but the corresponding Senate group went further and secured full-committee approval of a substitute for the Kerr bill drafted by Sen. Lyndon Johnson of Texas, subcommittee chairman.

The Johnson substitute, adopted unanimously by the subcommittee and tentatively approved by a six-to-three vote of the full committee, amends the Natural Gas Act only to the extent necessary to insure the exemption from control of sales by independent producers and gatherers to interstate pipe lines.

Substitute Less Restrictive

"No evidence presented to the subcommittee during our recent hearings indicated a compelling need for adding to or subtracting from the powers which the Federal Power Commission, under the Natural Gas Act, has actually employed and exercised," Johnson explained. "For this reason, a careful effort has been made to leave unmolested the authority which the commission has utilized throughout the past 11 years."

Accordingly, Johnson said, the substitute does not seek to prescribe a rate-making formula nor limit the FPC's investigatory and certificate powers as did the Rizley-Moore bill, nor does it seek to remove commission jurisdiction over any segment of the integrated pipe-line companies or exempt a natural-gas company's sale from its own leases, as contemplated in the Kerr bill.

The bill specifies that arm's-length sales by one independent producer or gatherer to another producer or gatherer, or arm's-length sales by independents at or prior to the point of delivery into interstate transmission facilities of a natural-gas company would be exempt, together with the incidental transportation necessary for delivering the gas to another independent producer or gatherer or into interstate transmission facilities. It is clearly specified that producers and gatherers will be exempt only if not otherwise engaged in and not controlled by or controlling a person otherwise engaged in transportation or sale of natural gas for resale in interstate commerce.

"Arm's-length sale" is defined as any sale which would not be determined by the courts as in violation of the Sherman Antitrust Act and not made by a person in such relation to the buyer by reason of voting-stock interest, common officers or directors, or other evidence of affiliation, that there is liable to be such an absence of independent bargaining between them as to be contrary to the public interest.

Ignores Rates

"Nothing in this bill, as amended, would make a rate increase to consumers automatic, necessary or inevitable," Johnson declared. "For 11 years the commission has, even in the opinion of opponents to the Kerr bill, been successful in giving tangible protection to the consumer. This has been accomplished without actual or threatened control of independents. No control has been exercised to this hour and it is our opinion that none should be exercised.

"If we permit an OPA price to be placed upon the commodity of an independent gas producer through default of our congressional duties, that will be the only instance of our economy where a nonutility price is fixed. No present or foreseeable peril to the consumer exists which would justify such isolated price fixing. If we can expect continued vigilance on the part of the commission, I believe we can realize further savings for the consumer after passage of this bill."

The legislation worked out by the House subcommittee is similar to the Senate bill except for the inclusion of a second amendment to provide for a "field price" on gas produced by the natural gas companies, their subsidiaries and affiliates.

O. I. I. C. ORGANIZES FOR "GRASSROOTS" PROGRAM

Typical of the area organizational and informational meetings being held throughout the country by the Oil Industry Information Committee is this group at Ardmore, Okla., being addressed by J. J. Nemeth of Continental Oil Co., Ponca City, who assisted in setting up the local organization. The meeting was attended by 160 oil men who paid their own expenses to participate in response to invitations from Area Chairman Harold B. Fell, independent producer (seated left of speaker). This year's O.I.I.C. program is based at the community level, and groups such as this are told the what, why, and how of the program, given simplified procedure manuals and work material, and launched on a continuing program of supplying their localities with information about the oil industry

Rayburn to Offer New Formula For Settling Tidelands Dispute

WASHINGTON.—Rejection by Atty. Gen. Tom C. Clark and Interior Secretary J. A. Krug of the proposals worked out early this month by state officials for a "compromise" on the tidelands issue was implicit last week in the disclosure by House Speaker Sam Rayburn of Texas that he was working on a new formula for an agreement which he hoped to submit to federal and state officials this week or next.

Rayburn, who has been acting as contact between the officials of Texas, Louisiana, and California and the Justice and Interior departments, announced that a new start was to be made on the negotiations after an hour-long conference with Clark and Krug.

He said the discussion covered the problem generally and denied the original proposals had been refused or that the matter was deadlocked, but the very fact that he was preparing to work out a new proposition indicated that the federal officials were not satisfied with what had been laid before them.

Bill Is Introduced

Meanwhile, the administration's bill defining the respective limits of federal and state jurisdiction in the tidelands *(The Oil and Gas Journal, June 16, page 74)* was introduced in the House of Representatives by Congressman Emanuel Celler of New York and was referred to the judiciary committee of which Celler is chairman, for consideration.

There was no indication that Celler would call hearings on the bill in the near future with the idea of securing its enactment this session, and the measure is seen as having no more chance of quick action than any other of the many bills on tidelands which have been pending for months.

The whole tidelands question had been on ice for 3 weeks while the state officials awaited the reaction of Clark and Krug to their proposals for a compromise.

Rayburn said the new proposals would be based on suggestions "from people I think are competent to make them," who might include state officials, members of Congress or government officials.

The original proposals called for abandonment of all federal claims to submerged inland areas; acknowledgment of paramount rights of federal Government in the submerged coastal areas with respect to navigation, defense, and international relations; state control of the tidelands with respect to oil development, taxation, and policing, and a trade giving the federal Government 37½ per cent of the oil income from the tidelands under state control and giving the states a similar cut from the area beyond, under federal control.

The proposals called for state ratification of any legislation enacted by Congress to carry out this arrangement, which reportedly was not acceptable to Justice Department officials, who wanted straight legislation which the states would have no authority to accept or reject.

New Plan a Supplement

Rayburn indicated that his new proposals might be supplementary to those originally submitted, making it plain he did not consider the latter to have been definitely turned down.

"I'm trying to get some grounds for discussion," the speaker told reporters. "There's plenty of room for dickering on a lot of things.

"If we can get an agreement, tidelands legislation will be easy to pass; if we can't, I wouldn't think there would be much chance."

Rayburn said the Celler bill had nothing to do with the efforts to develop a compromise, and Clark and Krug previously had stated that the sending of legislation to the Capitol on the heels of the submission of the states' proposals was purely a coincidence. That bill merely acknowledges state ownership of bays, harbors, and other inland waters, while conceding nothing in the open sea.

Husky Cuts Oil Price in Alberta, Saskatchewan

Husky Oil & Refining, Ltd., Canadian subsidiary of Wyoming's Husky Refining Co., posted a reduction in price of 20 cents per barrel on the heavy black crude oil produced in the Lloydminster and Vermilion fields of Alberta and Saskatchewan. The price reduction became effective June 22.

Husky, the principal refiner of Lloydminster crude, did not reduce the price of crude last December when a general drop from 50 to 75 cents per barrel on refined products, together with a price reduction in light crude oil in Alberta, was effected. Recent price reduction on Bunker C and light fuel oil forced the present cut.

Husky Oil & Refining will now pay $1.05 per barrel for crude oil under 10° gravity containing less than 0.5 per cent b.s. and w. For crude with gravity range 10° to 11.9°, posted price is $1.07 per barrel. Oil with gravity over 19.9° will sell at $1.17 per barrel.

Offshore Seismic Rules To Protect Marine Life

AUSTIN.—New rules for seismic exploration in the Texas tidelands, announced last week by Land Commissioner Bascom Giles, emphasizes protection of fish and other marine life.

In announcing the new rules, Giles said he was sending Carroll Munroe, of the land office, to the coastal area to investigate reported killing of fish. Rules announced are effective in both leased and unleased areas. Prior to the present session of the legislature, it was illegal to carry on exploration work in unleased areas. However, house bill 665, which was recently signed into law by the governor, permits such work.

The new rules are as follows:

Explosive shots will be limited to 40 lb., and no shot may be fired except during daylight hours. The size of the shot may be increased by special permission, under special conditions.

Shots fired in the Gulf of Mexico must be suspended "at a depth not greater than one-half the distance from the surface to the bottom. The shot may not be nearer to the bottom than 5 ft. and if buried must be at least 10 ft. below the bottom.

Shots fired in the bays or inland waters or within 1 mile of the mouth of any river must be placed at least 20 ft. below the bottom.

Any shot placed for firing must be discharged before an exploration party leaves the location.

Any fish or marine lift must be driven away by approved methods before any shot is discharged.

No shot may be detonated within 1 mile of any fishing or shrimping fleet.

Any violation of the above rules is punishable by a fine of not less than $100 and not more than $1,000.

Mineral Rights on Navy Land Are Transferred

WASHINGTON.—Transfer from the Navy to the Interior Department of some 100 acres of oil-bearing lands comprising the Naval Hospital site at Long Beach, Calif., was ordered last week to protect the Government from drainage of oil and gas by wells on adjacent privately owned properties.

The hospital site is located at Seventh Street and Bellflower Boulevard. Interior will take jurisdiction only for the purposes of protecting the oil reserve, the Navy retaining control of the land for naval purposes.

this week

INTERNATIONAL—Commercial oil discovery reported in Italy's Po Valley. . . . Well flowed about 200 bbl. of light-gravity oil with large quantities of gas. . . . ¶Middle East Pipe Lines signs agreement for transit rights with Syrian Government. . . . Company still has not reached agreement with Iraq. . . . ¶Ecuador Oilfields defers temporarily deep-drilling exploratory program. . . . Will use rigs in Tigre area. . . . ¶Construction gets under way on British plant to produce carbon black from oil. . . .

GOVERNMENT—Max Ball tells State Department big oil loan to Mexico would be "disservice" to both nations. . . . Declares chances of monopoly, even in United States, finding sufficient oil "too slim." . . . Canada, Ball declares, offers better possibilities without hampering restrictions. . . . ¶Legislation to exempt producers and gatherers of natural gas from FPC control moves forward in both houses of Congress. . . . ¶M. G. Gamble, head of Jersey Standard marine operations, tells senators tankers under foreign registry are 25 per cent cheaper to operate. . . . Declares company now has more ships than needed for coastwise requirements. . . .

TRENDS—Total well completions in the 25-week period ended June 25 were 4.0 per cent greater than in same period last year. . . . Total for all areas other than Pennsylvania Grade region increased 9.2 per cent. . . . Completions in Texas were up 20.0 per cent over last year. . . . About 63 per cent of Texas gain was in North Central and Panhandle districts where average well depth is about 30 per cent less than the state average. . . . ¶Wildcat completions for all areas increased 14.3 per cent over the same period last year. . . . ¶Rotary rigs in operation for past 8 weeks have failed to follow the sharp upward trend of the same weeks last year. . . .

NATURAL GASOLINE—Contract let and preliminary construction started on McAllen, Tex., natural-gasoline plant. . . . Capacity will be 75,000,000 cu. ft. daily. . . . ¶Operation of Brookhaven, Miss., natural-gasoline plant will begin August 1. . . .

REFINING—Improvement work at General Petroleum Corp.'s Torrance, Calif., refinery is nearing completion. . . . ¶Imperial Oil, Ltd., plans to step up capacity of Regina refinery to 16,000 bbl. daily. . . . ¶Sunray Oil Corp.'s Duncan, Okla., refinery crude unit cleaned, revamped. . . . ¶Delayed-coking unit being planned by Root Petroleum Co. at El Dorado, Ark., refinery. . . .

PIPE LINES—Imperial Oil, Ltd., considering 20-in. crude-oil pipe line from Edmonton to Regina instead of the 16-in. line previously announced. . . . Capacity would be from 150,000 to 175,000 bbl. daily. . . . ¶Shell Pipe Line Co.'s 41-mile line now about half completed. . . . ¶Firm seeking gas reserves to be used for comtemplated natural-gas line from New Orleans to the Chicago area. . . . ¶Work begins on 50-mile, 6-in. Michigan crude-oil line.

TIDELANDS—Proposed compromise on question unacceptable to government officials. . . . House Speaker Rayburn says he is working on new formula for agreement to submit to state and federal officials. . . . ¶William H. Davis, special master, submits procedure to be followed by Supreme Court in delineating California tidelands areas.

PRICES—Husky Oil & Refining, Ltd., posts reduction of 20 cents on heavy black crude in Lloydminster and Vermilion fields. . . . ¶Simrall Division of Roosevelt Oil & Refining Corp. adjusts prices of Michigan crudes. . . . Change in postings averages 7-cent increase. . . .

A raging brush fire which swept over 3,000 acres raced through Puente Hills East-Whittier oil field June 22 and 23, destroying 40 old derricks and causing damage to oil property estimated at $300,000. Smoke from burning sumps could be seen from downtown Los Angeles, 15 miles away

Latest Court Decision Seen as Not Clarifying Natural Gas Act

by Henry D. Ralph

THE decision of the Supreme Court of the United States last week holding that the Federal Power Commission cannot stop Panhandle Eastern Pipe Line Co. from selling undeveloped gas reserves appears on first reading to be a clear-cut delineation of the FPC's authority over production and gathering of natural gas, but closer study suggests that it could prove to be another in the series of ambiguous opinions that have plagued the natural-gas industry.

This possibility lends emphasis to the need for Congress to clarify FPC's jurisdiction as soon as possible, for the Panhandle decision certainly does not do that. This is evident from the division of opinion within the Supreme Court itself. For example, the dissenting opinion, written by Justice Black, says:

"Today's opinion interprets this (Natural Gas) Act as denying the commission all authority to perform any action or issue any order to regulate an interstate company's interest in natural-gas properties."

Yet the majority of the court did not seem to think their decision was so sweeping. They held only that the commission cannot prevent an interstate company from selling undeveloped gas leases to a company which proposes to sell gas in intrastate commerce.

Too Late?

The present muddle over the commission's authority might never have developed had this Panhandle decision come several years ago, before the series of Supreme Court decisions which gave some members of FPC the idea that they have virtually unlimited jurisdiction over production and gathering. In cases involving Colorado Interstate Gas Co., Hope Natural Gas Co., and Interstate Natural Gas Co., a divided court upheld FPC in regulating various phases of the production and gathering activities of interstate pipe-line companies, and suggested that further incursions into this area of regulation might be permissible.

The Panhandle decision does not reverse those cases, in spite of Justice Black's dissenting view, although the reasoning seems to be somewhat contrary to that which prevailed in the earlier decisions. For instance, the majority opinion by Justice Reed says:

"The Natural Gas Act did not envisage federal regulation of the entire natural-gas field to the limit of constitutional power. Rather it contemplated the exercise of federal power as specified in the act, particularly in that interstate segment which the states were powerless to regulate because of the commerce clause of the federal constitution. The jurisdiction of the Federal Power Commission was to complement that of the state regulatory bodies.

Only Three Realms

"Three things and three only Congress drew within its own regulatory power, delegated by the act to its agent, the Federal Power Commission. These were: (1) the transportation of natural gas in interstate commerce; (2) its sale in interstate commerce for resale; and (3) natural-gas companies engaged in such transportation or sale.

"The act, moreover, expressly exempts from its coverage (1) any other transportation or sale of natural gas; (2) the local distribution of natural gas; (3) the facilities used for local distribution; and (4) the production and gathering of natural gas.

"The commission seeks to distinguish between the activities of production and gathering, such as drilling, spacing wells, or collecting gas, and the facilities, such as reserves and gas leases, used therefor and argues that only the former were excluded from the coverage of the act. In support of this position it is pointed out that the section specifically exempts both the local distribution and the facilities used therefor while it makes no mention of the facilities used for production or gathering. In the face of the unambiguous language of the act and its legislative background, we cannot ascribe such a narrow meaning to the words 'the production or gathering of natural gas.'"

Can Determine Rates

That last paragraph would seem to be clear enough, yet the decision goes on to affirm the court's ruling in earlier cases that FPC, under its rate-making authority, can include the fair value of the production and gathering facilities in the rate base of a natural-gas company.

This Panhandle decision, therefore, would seem to give some comfort to independent producers of natural gas in that, by implication at least, it excludes their activities from FPC regulation. But it does not go far beyond clarifying the degree of freedom which interstate companies have in their own production and gathering activities.

All that Panhandle was doing in this case was to sell undeveloped leases covering 12 per cent of its total natural-gas reserves to a company which proposed to sell the gas intrastate. There is no indication in the decision as to what might happen should an interstate pipe-line company attempt to sell to an "independent producer" all of the reserves and production facilities which it previously had dedicated to its interstate business and which otherwise would be subject to FPC jurisdiction.

Sinclair, Union Agree On Extension of Contract

NEW YORK.—Sinclair Oil Corp. and the Oil Workers International Union have agreed on terms to extend the company's nation-wide union contract for another year.

The new contract, reached after negotiations in New York, continues to July 1, 1950, and is subject to ratification by the union. It was learned early this week that the agreement liberalizes vacations to 2 weeks after a single year and sick pay depending on length of service, sets up a committee to study a pension plan, and provides that the question of a shorter work week may be brought up during the life of the contract.

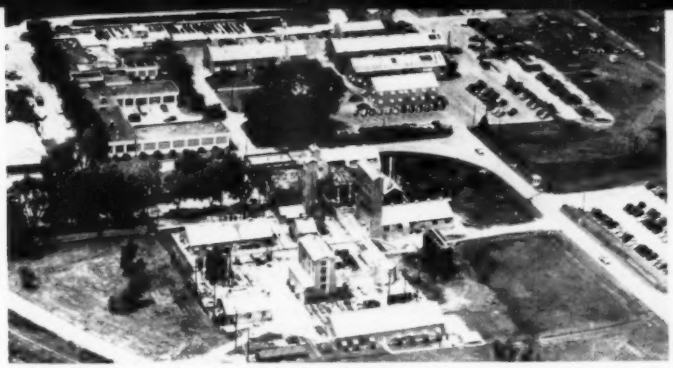
The general wage question was not raised, and any inequities will be adjusted on a local level. Sinclair is the only major company with a nation-wide contract, having had such an agreement for about 13 years. The contract covers between 8,000 and 10,000 employes in the production, pipe-line, and refining divisions of the company.

Simrall Increases Prices For Michigan Crude Oils

Simrall Division of Roosevelt Oil & Refining Corp. last week adjusted upward the price of crude oil it buys in Michigan.

The purchasing company announced new prices for all the fields in which it purchases, the change indicating an increase, on the average, of about 7 cents per barrel.

Simrall on May 16 cut prices 22 cents across the board. Leonard Pipe Line Co., which buys in the same area, on June 13 reduced prices 15 cents a barrel. The increase by Simrall is believed designed to meet competitive prices. The Simrall increases ranged from 3 to 16 cents per barrel. In some fields the adjustment resulted in a decreased price.



(Left) Looking down on Stanolind's Tulsa research laboratories (courtesy D. L. Curtis, Aerial Photo Service). (Right) High-pressure windowed cell for study of volumetric and phase behavior of oil and gas under conditions up to 20,000 psi. and 450°F.

Stanolind Exhibits Research Facilities

Exhibit of core drills, seismograph trucks, special gravity meter and automatic elevation-meter cars, well-bore water-level determination equipment—all in rear court of central lab building

STANOLIND OIL & GAS CO. conducted an open-house inspection program of its Tulsa research laboratories this past week-end for families of its employes, and the trade press. The review was a growth marker for the company's research program which now encompasses an annual expenditure of several million dollars for research and a 23-acre scientific plant employing 450 persons. Back in 1932 there was one staff member employed in the department.

Three Kinds of Research

The Stanolind laboratories do three distinct kinds of research. One is process research. It is primarily the study of new ways to make gasoline, fuel oil, and chemicals from natural gas. Another is exploration research; it involves the development of better instruments and methods for finding oil and gas reservoirs. The third is production research. It includes studies of improved ways of drilling for oil and gas, and of recovering the greatest possible amount of hydrocarbons from each reservoir.

The buildings in the process-research section include pilot plants, laboratories, offices, and shops. All are devoted to work on the hydrocarbon-synthesis process. Here is how the process works: Natural gas and oxygen are burned in the combustion chamber, under high pressure, to form the synthesis-gas mixture. This mixture—two parts of hydrogen and one of carbon monoxide—then goes to the synthesis pilot plant. It is compressed to higher pressures and fed into a fluid reactor, where it is in close contact with tiny particles of iron catalyst. In the presence of the catalyst, carbon monoxide and hydrogen react to form hydrocarbons (raw materials for gasoline), water, and by-product chemicals. The chemicals include various alcohols, acids, ketones, and aldehydes. The chemicals finally go into the manufacture of hundreds of different products, from plastics to cosmetics.

Experimental well for drilling, cementing, and artificial-lift studies

Good Wildcat Record

The results of the company's efforts on exploration research is reflected in Stanolind's record of successful wildcat wells. In the past 10 years, Stanolind has completed 30 per cent of its wildcats as producers of oil or gas. Over the same period the industry average was 17½ per cent.

Production research in part is concerned with developing more efficient ways of recovering more oil and gas from underground reservoirs. In addition are studied drilling bits and drilling muds; oil-well cements and cementing practices; development and use of special field testing instruments.

Senators Learn Foreign-Flag Tankers Cost Less to Operate

WASHINGTON.—Tanker operation under foreign flags is 25 per cent cheaper than under United States registry, and more than 90 per cent of the saving is in the crew wages, a Senate interstate commerce subcommittee was told last week by Millard G. Gamble, general manager of marine operations of Standard Oil Co. (N. J.).

Gamble was the first witness before the subcommittee in an investigation of a proposal by Standard to transfer six smaller oil carriers to foreign registry in order that four of the fourteen 26,000-ton tankers which the company plans to build may be registered in the United States.

Standard has a fleet of 119 tankers of 1,930,000 deadweight tons, 54 of them under domestic and 65 under foreign registry, equal to 10.1 per cent of the United States and 6.8 per cent of the foreign tanker fleet, Gamble testified.

Domestic Tonnage Too High

He explained the company normally would wish to be covered 110 to 120 per cent against domestic coastwise requirements in order to be assured of coverage in peak seasons and to provide flexibility in operations, but at the present time its domestic tonnage is approximately 190 per cent of requirements and will probably average 160 per cent or more through next year. Further additions to its American flag fleet cannot be justified except by compensating transfers, he said.

Gamble declared there is comparatively small business advantage in placing the new large vessels under the American flag, "and if we looked at the subject purely from a dollar and cents standpoint we would be entirely satisfied to place the new vessels under foreign flag, leaving the six older vessels under United States flag.

"However," he added, "we feel and always have felt that it is in the national interests, and particularly in the interest of national defense, to have these large, high-speed, modern tankers under United States registry."

Competition makes necessary the use of foreign-flag tankers in world trade, he said later, and it is not a question of choosing between American and foreign-flag vessels for foreign business. "The real choice is between the various foreign flags, of which Panama is one. I think the judgment of you gentlemen is better than mine as to which of the foreign flags would be preferable in a time of national emergency."

The six vessels which it is proposed to transfer were originally built for Panama Transport Co., a Standard affiliate, for use in foreign operations but, because of the war, were registered under the United States flag at the request of the Maritime Commission, Gamble explained.

Gamble told the subcommittee that crew wages under foreign registry range from 26 to 58 per cent of the cost under the United States flag, the low figure being for Netherlands and the high for Canadian crews. The company mostly uses British and Italian crews at 35 and 34 per cent of the United States wages, respectively.

Poulin Named to Head OGD's Foreign Branch

WASHINGTON. — Appointment of John A. Poulin of Kingston, N. Y., as head of the foreign branch of the Oil and Gas Division was announced last week by Acting Director Carroll D. Fentress.

Poulin was an engineer and geologist with the Sinclair Exploration Co. in Venezuela and Colombia from 1926 to 1937, when he went with Texas Petroleum Co. In 1943 he became vice president and manager of United Geophysical Co., and later was employed as a consultant for South America and the British West Indies by Superior Oil Co.

Seven Secondary-Recovery Projects Set for Hearing

AUSTIN. — Seven applications to operate secondary - recovery projects will be heard by the Railroad Commission during the early part of July.

Shell Oil Co., Inc., is requesting permission to inject gas into the 4,780-ft. Gravis sand through its 1 Wilson well, located in the Benavides field, Duval County. On the same date, July 6, the commission will hear Shell's application for a pilot-flood project in North Government Wells field, Duval County.

Two applications will be heard July 7. K & G Production Co. et al are asking to carry on a pressure maintenance project, using both gas and water, in Kadane field, Archer County. J. S. Abercrombie Co. is requesting authority to conduct a water-flood operation in Old Ocean field, Brazoria and Matagorda counties.

On July 8, hearing will be held on the application of D. Houston Bolin to conduct a water-flood project in the Kermit field, Winkler County. Two hearings are scheduled for July 12. Round Top Oil Co. is asking to repressure the Swastika sand in Round Top field, Fisher County. The Wimberly Conservation Association is asking approval on a cooperative pressure-maintenance program in the Lower Hope and Flippen sand reservoirs of Wimberly field, Jones County.

U. S. Ships Move Record Tonnage Through Suez

WASHINGTON. — American - flag vessels made record-breaking use of the Suez Canal during 1947 and 1948, largely because of our increased imports of oil from the Persian Gulf, the Office of International Trade reported this week in a review of Suez operations.

In the first 6 months of 1948, our petroleum imports moving through the canal totaled 840,000 tons, which was more than the traffic of all commodities moving to the United States via that route in comparable prewar periods. United States flag vessels now carry approximately 20 per cent of all traffic through the canal, as compared to slightly more than 6 per cent during the 1927-37 period, the OIT stated.

The United States is expected to continue as a net importer of petroleum in 1949, but completion of oil-transmission lines in the Middle East, such as the Trans-Arabian pipe line, will doubtless reduce the use of the Suez Canal for petroleum movement.

Oklahoma, Kansas Cut July Output Allowables

Oklahoma's July crude allowable was cut 28,000 bbl. daily to 360,000 bbl. daily in a June 28 order of the Corporation Commission. The commission followed a recommendation by Conservation Officer Walker T. Pound, who told it "there is too much oil in sight."

Earlier production allowable in Kansas for July was cut sharply to 245,000 bbl. daily, a 30,000-bbl. reduction, and Louisiana's daily allowable had been set at 500,000 bbl. daily, continuing in effect the 10 per cent special reduction order of June 15.

The Oklahoma allowable cut was effected by reducing the allowables for all fields 10 per cent except in cases of stripper-well leases.

The Kansas reduction was the sharpest in a series of cuts. The state previously had ordered two 5,000-bbl. and one 10,000-bbl. cuts.

In commenting on the new Louisiana figure, Commissioner S. L. Digby said it will be achieved by reducing over-all depth allowables on a statewide scale.

BY BERTRAM F. LINZ

WASHINGTON WATCHING

Crowell in OGD?

WASHINGTON.—Next director of the Oil and Gas Division may be Alec M. Crowell, 44-year-old Shreveport oil and gas consultant widely known throughout the Southwest.

Crowell, who was called in by Ralph K. Davies to organize the production and reserves division when the OGD was set up, is known to be quite concerned about the future of the organization and to have made that concern known to Interior Secretary J. A. Krug.

Because of his interest in the agency and its objectives, it is believed Crowell would be receptive to an offer of the directorship. Like Max W. Ball, a consultant, he would have the advantage of being tied to neither major companies nor independents, and his long experience in various branches of the industry gives him the background to deal with the problems of the office, while his association with federal agencies has acquainted him with government procedures.

Crowell has had a broad and diversified experience in oil and gas matters with companies engaged in both fields. He was for 6 years chief gas engineer for the Texas Railroad Commission and was loaned to the Arkansas Oil and Gas Commission to organize it, remaining for 5 years as director. He has been a special consultant to the Federal Power Commission and was a charter member of the engineering committee of the Interstate Oil Compact.

While Krug has before him several names submitted by the National Petroleum Council, there is no indication that any of the men suggested was approached in advance to see if he would take the job, which has been turned down by a number of men previously suggested for one or another of several reasons—the small salary of $10,000 a year, uncertainty as to Krug's tenure and consequent uncertainty as to the identity and policies of his successor being the most important.

Wherry Triumph

THE tide of battle between Senate banking and currency committee Chairman Burnet R. Maybank of South Carolina and Republican Floor Leader Kenneth S. Wherry of Nebraska over revival of the Senate small business committee, which gave Wherry so much publicity when he investigated the oil industry during the last Congress, turned in the latter's favor last week when the rules and administration committee approved the Wherry-Holland bill.

The small business committee went out of business with the end of the Eightieth Congress, and early this year Maybank made it clear that his committee and no other was going to look after the interests of small business. When Wherry introduced a resolution to set up a separate committee, Maybank had it referred to his committee, where it was promptly killed.

Later, Wherry teamed up with Democratic Senator Spessard Holland of Florida and introduced another resolution which they managed to have referred to the rules committee.

Last session, Wherry was chairman of the special committee, which conducted extensive investigations into the oil supply situation, steel-pipe exports and other matters involving the petroleum industry, and this year wound up its work with a number of lengthy reports. He is not a member of Maybank's committee, and would have been out in the cold had Maybank been permitted to go ahead with his original plan to set up a small-business subcommittee. As coauthor of the legislation to set up a special group, he is sure of being made the top-ranking minority member, and being a very industrious person undoubtedly will have much to do with running the committee.

Now It's Ships

MEMBERS of Congress are evincing growing concern over the health of our merchant marine and particularly the use of foreign registry by American companies who then operate their ships through subsidiaries.

This was made evident last week when a Senate interstate commerce subcommittee under Sen. Warren G. Magnuson of Washington started an investigation of the subject by questioning Millard G. Gamble of Standard Oil Co. (N.J.) regarding the tanker operations of that company.

Gamble explained that there is a 25 per cent differential in operating costs between American and foreign flag vessels which is highly important in the international oil trade making it necessary for Standard to maintain a substantial fleet under the flags of nine foreign countries, and said that his company, for one, could not register any new tankers under the United States flag unless a corresponding tonnage in older vessels could be transferred foreign, because it would have more tonnage than could be used in the domestic trade and which could not compete abroad.

But Magnuson made it clear he was seeking a way to prevent further transfers, not only of tankers but of cargo carriers as well, asserting that our merchant marine is the sickest segment of our economy while the healthiest segment of that of the other maritime nations.

"Everybody is trying to get out from under the American flag," Magnuson complained. "The merchant marine is important to the national defense and tankers are most vital."

Sen. Owen Brewster of Maine also was critical, but based his objections on the charge than American companies use foreign subsidiaries to avoid the payment of taxes during periods when rates are high. Brewster called for figures on Standard's dividend payments over the past 10 years, with a view to showing that its foreign subsidiaries withheld their earnings during the high-tax years. It will be recalled that Brewster made the same charge with respect to Arabian American Oil Co. last year.

Magnuson will at least turn the spotlight of publicity on companies operating their vessels under foreign registry. He told Gamble that Jersey was not the only company that would be called upon to explain, but that he intended to call all oil companies and cargo carrier operators to give data regarding their foreign-flag operations, publication of which, he said, may "prove salutary."

Rough Sledding

LEGISLATION permitting sellers to quote delivered prices and absorb freight, already passed by the Senate in an effort to straighten out the muddle created by the Supreme Court decision last year in the Cement Institute case, prohibiting the use of basing point prices, is facing its toughest tests, first in the House rules committee and then on the House floor.

The House Judiciary Committe last week gave its blessing to the bill after eliminating the so-called Kefauver amendments adopted by the Senate which would have denied sellers the right to absorb freight to meet the equally low price of a competitor in good faith when the effect would be substantially to lessen competition.

These amendments, in effect, would have perpetuated the ruling of the Seventh Circuit Court of Appeals in the Standard Oil Co. case that good faith is not an adequate defense for price cuts which would have such effect.

The bill was sent to the rules committee to clearance for consideration by the House, and it is here that the first of two major battles which are in prospect is being fought.

The most vigorous opponent of the legislation is Rep. Wright Patman of Texas, who urged the committee not to send the bill to the floor until his small-business committee can make an investigation. Rules Committee Chairman Adolph Sabath of Illinois has not indicated what action he will take, but has promised that everybody who wants to will be permitted to appear before the committee when it takes up the bill.

Patman has been filing attacks against the legislation in the Congressional Record two or three times a week over a considerable period and also appeared before the judiciary committee to oppose favorable action on the bill, but had not indicated he was undertaking an investigation until the matter reached the rules committee, whereupon he announced hearings would start this week.

If the bill is sent to the floor by the rules committee, Patman will make a last-ditch fight against it, but is not believed at this time to have sufficient support to kill it.

New Compilation Permits Completion Of Records of Monthly Stock Figures

A "BLIND spot' in statistics on fuel-oil stocks has been eliminated by a new compilation by the U. S. Bureau of Mines, and is presented here to enable oil-company statisticians to complete their records and to make an accurate comparison of monthly stock figures for this year with those for 1948 on a comparable basis.

Early this year a change was made in the method of reporting distillate and residual fuel-oil stocks in California. Figures on the new basis were reported by the Bureau of Mines in the January Monthly Petroleum Statement which was released in March, but since data for 1948 on the new basis were not available, stock comparisons with last year were not possible. Weekly reports of the A.P.I. were changed to the new basis with the report for March 12.

The California office of the bureau has collected data on 1948 inventories using as a basis comparable with that of current reports. The change involved a shift of distillate cracking stock to "other unfinished" to bring California reports more in line with the reports from other areas of the country. Also, "crackable stocks" were taken out of residual inventories and added to "other unfinished."

STOCKS

(Thousands of barrels)

	—Distillate—		—Residual—	
1948	Calif.	U. S.	Calif.	U. S.
Jan. 1	12,182	49,478	12,324	38,148
Jan. 31	11,954	39,788	13,655	36,260
Feb.	10,008	33,019	13,760	35,602
March	9,114	30,570	13,380	34,192
April	8,272	32,564	13,987	35,527
May	8,904	38,551	15,940	41,123
June	9,222	45,835	17,555	44,213
July	10,382	56,045	19,151	49,448
Aug.	11,136	65,887	20,703	55,009
Sept.	11,226	73,854	21,037	58,682
Oct.	11,692	79,992	22,644	61,456
Nov.	11,759	80,658	24,598	64,865
Dec.	10,746	71,475	25,176	64,021

The accompanying tabulation shows California and United States stocks of distillate and residual comparable with data being reported currently.

Humble Activities Will Increase, Baker Says

HOUSTON.—A higher level of operation in the second half of the year than in the first half because of increased demand is predicted for his company by Hines H. Baker, president of Humble Oil & Refining Co.

Baker reported that Humble's operations during the first quarter of this year were lower than a year ago by 12 per cent in production, 9 per cent in refining, and 17 per cent in transportation by pipe line. Further reductions, he added, occurred during the first part of the second quarter. This reduced activity is attributed to increased supplies and stocks during 1948 with a resultant "definite surplus."

In his discussion, which appears in the current issue of the "Humble Way," Baker stressed the increasing importance of natural gas. When authorized and planned gas processing and conservation projects are completed, the Humble company will have a total investment in such facilities of about $43,000,000. These facilities will increase the volume of casing-head gas being saved by the concern to 350,000 M.c.f. daily. This amounts to above 90 per cent utilization of casing-head gas which is close to the economic limit, according to Baker.

With regards to operations on the Continental Shelf, Baker said, "It is hoped that the title controversy between the federal Government and the states of Texas and Louisiana will be satisfactorily resolved by Congress at this session in such manner as to encourage prompt development of the potential offshore resources and protect the investments made in good faith by numerous companies."

The Humble president stated that his company has spent $25,000,000 offshore—$6,000,000 for the purchase of leases and $19,000,000 for marine equipment, drilling platforms, and related facilities, and in actual drilling. The company is currently operating seven drilling rigs on offshore leases, at a cost of about $1,200,000 per month.

Osages Thwarted in New Attempt to Nullify Lease

WASHINGTON. — The District of Columbia Federal Court last week refused to enjoin Secretary of the Interior Krug from approving a lease on oil lands which six Osage Indians contended would cut down their royalties.

The Indians, who contended they were acting on behalf of a minority group of more than 500 Osages who share in the royalties, sought to hold up the lease pending the outcome of an $11,000,000 damage suit brought by them in the federal court at Tulsa June 10 against a group of oil companies.

The Oklahoma suit accused the companies of having failed to produce oil by water flooding and sought to set aside present leases under which the Indians get one-sixth royalty and to prevent Secretary Krug from signing a new lease calling only for one-eighth royalty.

The restraining order was denied on the ground the court does not have jurisdictional authority to grant it.

Seiger Named President of Canadian Gas Association

Charles M. Seiger, assistant general manager of United Gas & Fuel Co., Hamilton, Ont., was elected president of Canadian Gas Association at the organization's forty-second annual convention recently in Muskoka, Ont.

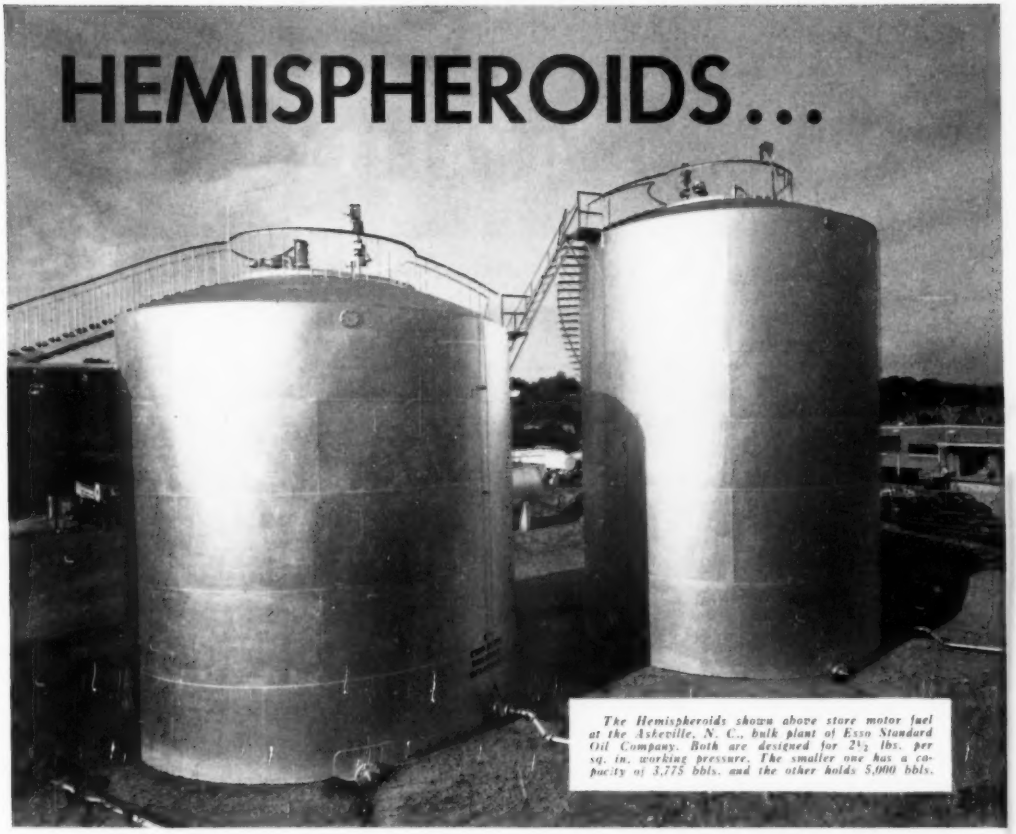
Hugh G. Smith, secretary of Consumers Gas Co. of Toronto, was named first vice president, and R. M. Perkins, manager of Windsor Gas Co., Ltd., Windsor, Ont., was elected second vice president.

Superior Suspends Drilling Operations at Deep Well

Drilling halted last week at Superior Oil Co.'s Pacific Creek Unit 1 in Wyoming, the world's deepest well.

Early this week the well, being drilled as a tight hole, was reported being tested below casing. Present depth of the well is 20,521 ft.

HEMISPHEROIDS...



The Hemispheroids shown above store motor fuel at the Asheville, N. C., bulk plant of Esso Standard Oil Company. Both are designed for 2½ lbs. per sq. in. working pressure. The smaller one has a capacity of 3,775 bbls. and the other holds 5,000 bbls.

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New York, 6.....3347—165 Broadway Bldg.
Philadelphia, 3..1615—1700 Walnut Street Bldg.
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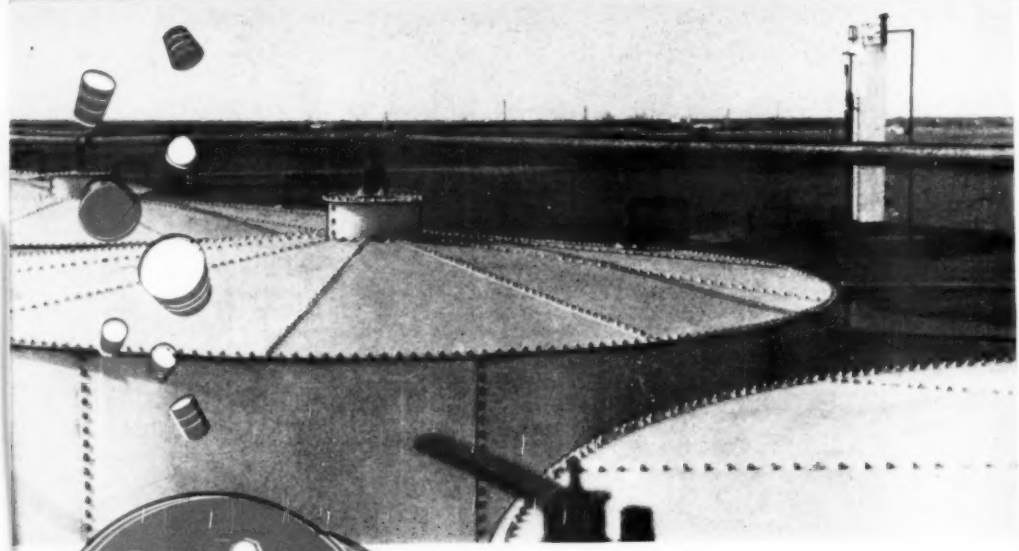

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Davis Recommends Procedure For Delineation of Tidelands

WASHINGTON. — Procedure to be followed by the Supreme Court in delineating the areas in the California tidelands which shall be left in state ownership has been recommended by William H. Davis, special master. Davis was appointed by the court last February to determine what particular portions of the state's seaward boundary call for precise determination under the 1947 decision giving the federal Government paramount rights to the submerged oil fields.

Davis recommended that a special master be appointed to take evidence and that a special court of federal judges then be appointed to make ultimate findings of fact or conclusions of law with respect to the lines of seven specific areas which he considers should be adjudicated.

Areas Listed

The seven areas include the three which the Government agrees should be delineated and four of the six which the state contended also should be defined.

The areas which Davis selected for action are those between Point Conception and Point Hueneme, between the southern extremity of San Pedro Bay and the western headland at the entrance to Newport Bay, and San Pedro Bay itself, proposed by the Government; and Crescent City Bay, Monterey Bay, San Luis Obispo Bay, and Santa Monica Bay, proposed by California. No action is necessary, he said, with respect to Arcata-Humboldt Bay and Bodega-Tomales bays.

Precise determination of any portion of the boundary is a surveying job in execution of a preliminary judgment fixing criteria, Davis told the court, but no such survey can be made until there has been judicial determination of the following three questions:

By what criteria is "the ordinary low-water mark on the coast of California to be ascertained?"

Are particular segments in fact bays or harbors constituting inland waters and from what landmarks are the lines marking the seaward limits of bays, harbors, rivers and other inland waters to be drawn?

What is the status (inland waters or open sea) of particular channels and other water areas between the mainland and offshore islands, and, if inland waters, then by what criteria are the inland water limits of any such channel or other water area to be determined?

Most, if not all, of the evidence on which a determination is to be made can be submitted in documentary form or in stipulations of fact as to physical and geographical factors and historical data, Davis reported, hence the recommendation for appointment of a master to gather such material and prepare it for submission to a special court.

Aromatic, Naphthenic Products Show Gain

WASHINGTON.—Production of aromatic and naphthenic products from petroleum and natural gas last year increased about 40 per cent over 1947, and amounted to 892,000,000 lb., it was announced this week by the Tarriff Commission.

Sales of these products amounted to 687,000,000 lb., valued at $26,000,000 the commission reported.

The major increases in output were in toluene, 161,000,000 lb. above 1947 to a total of 359,000,000 lb., and xylene, up 144,000,000 to 383,000,000 lb.

Production of butadiene declined 35,000,000 lb. to 661,000,000 lb. the commission said. Production of C_3 hydrocarbons (propane and proylene) amounted to 714,000,000 lb., an increase of approximately 250,000,000 lb. over 1947, the greater port being converted into isopropyl alcohol for the manufacture of acetone. Production of ethylene was 383,000,000 lb., an increase over 17947 of 12 per cent.

The commission's statistics were preliminary and approximately 95 per cent complete, it was stated. Complete figures will be given in a final report to be issued later in the year.

Oil Workers Union to Seek 4-Day Week in East Texas

R. O. Callaway, Oil Workers International Union workmen's committee chairman at Atlantic Refining Co., said he will recommend that the union request negotiations with the firm immediately for a 4-day work week without reduction in pay, following a company announcement of a proposed layoff of about 20 per cent of its hourly paid employes in East Texas field.

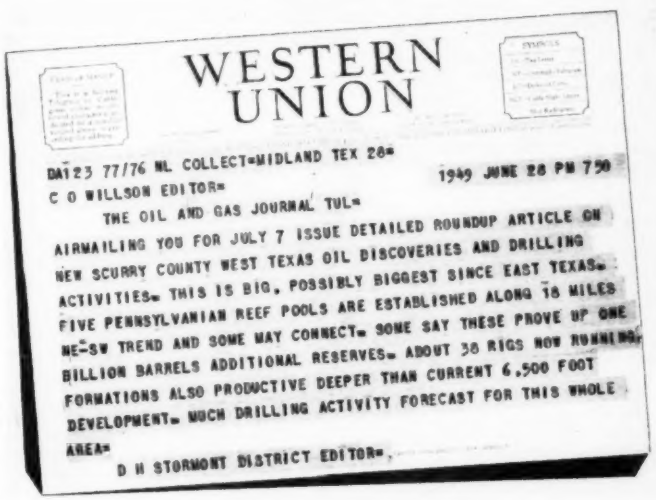
An official of Atlantic said the layoff, to go into effect July 1, will affect 24 men if the present plan under consideration materializes.

Fire Destroys California Refining Asphalt Plant

Fire June 23 destroyed the $500,000 asphalt plant in the Perth Amboy, N. J., refinery of California Refining Co. The plant had an average production of 1,200 bbl. of asphalt daily.

Company officials said the plant would be rebuilt soon and would be in operation again by next April. Near capacity crude runs will be cut proportionately, they said.

Next Week



WESTERN UNION

DA123 77/76 NL COLLECT=MIDLAND TEX 28=
1949 JUNE 28 PM 7 50
C O WILLSON EDITOR=
THE OIL AND GAS JOURNAL TUL=
AIRMAILING YOU FOR JULY 7 ISSUE DETAILED ROUNDUP ARTICLE ON NEW SCURRY COUNTY WEST TEXAS OIL DISCOVERIES AND DRILLING ACTIVITIES= THIS IS BIG, POSSIBLY BIGGEST SINCE EAST TEXAS= FIVE PENNSYLVANIAN REEF POOLS ARE ESTABLISHED ALONG 18 MILES NE-SW TREND AND SOME MAY CONNECT= SOME SAY THESE PROVE UP ONE BILLION BARRELS ADDITIONAL RESERVES= ABOUT 38 RIGS NOW RUNNING= FORMATIONS ALSO PRODUCTIVE DEEPER THAN CURRENT 6,500 FOOT DEVELOPMENT= MUCH DRILLING ACTIVITY FORECAST FOR THIS WHOLE AREA=
D H STORMONT DISTRICT EDITOR=

PERSONALS

Neptune Heads Foreign Division of Continental

MILLARD K. NEPTUNE has been named manager of the foreign department of Continental Oil Co., a newly established division, with headquarters in New York City.

Continental has been active in Canada for some time through its affiliate, Hudson's Bay Oil & Gas Co., Ltd. Early this year it joined Amerada Petroleum Corp. and Ohio Oil Co. to form Conorada Petroleum Corp., to search abroad for prospects considered favorable for oil and to negotiate for acquisition of operating rights on the prospects for the parent companies.

Neptune, a graduate engineer from Oklahoma University, joined Continental last year. Prior to his association with the company he was with Phillips Petroleum Co. and spent considerable time in Venezuela as assistant manager of Phillips Venezuelan Oil Co., a wholly owned subsidiary of Phillips. He was active in development of that firm's concessions in eastern Venezuela, in the states of Monagas, Anzoategui, and Guarico.

During the war Neptune served 2½ years with Petroleum Administration for War in Washington, D. C. He is also a graduate of the Oklahoma University law school.

Robert M. Beatty has been named manager of the geological division, American Republics Corp., Houston. He formerly was with DeGolyer & MacNaughton at Dallas, and Trinity Petroleum Co., Houston. **J. P. Black** has been named manager of the geophysical division of American Republics and will serve also as coordinator of exploration activities. He formerly was manager of the geological division.

Martin Buck, Shell Chemical Corp., has been appointed assistant to the vice president in charge of manufacturing.

James L. Burns, III, of Socony-Vacuum Oil Co., Inc.'s technical service laboratories at Brooklyn, N. Y., has been selected by the company for the 1949 incentive fellowship award for advanced study toward a Ph.D.

Albert A. Peer, formerly technical assistant in the paraffin treating department, Esso Standard Oil Co.'s refinery at Bayonne, N. J., has been named foreman in charge of the MEK dewaxing plant at Bayonne.

B. W. Pawson, Saskatchewan Federated Cooperatives, Ltd., has been appointed superintendent of the refinery division of the company at Regina, Sask. He succeeds **O. B. Males** who has retired and who will return to the United States.

W. E. Clack has been appointed laboratory supervisor, petroleum technical service laboratory operations and maintenance group, Esso Standard Oil Co., at the Baton Rouge, La., refinery.

Tom Batla, geologist, and **W. P. Larkin,** drilling superintendent, McCarthy Oil & Gas Corp., have been transferred from the company's Bakersfield, Calif., office to the home office in Houston.

Elmer C. Rogers, Union Oil Co. of California, has been named president of the Petroleum Accountants Society of Los Angeles. Other officers include **Harold D. Osborn,** General Petroleum Corp., first vice president; **Fred S. R. Sedding,** Doheny-Battson Interests, second vice president; **J. R. Brown,** Standard Oil Co. of California, secretary-treasurer; and **E. M. Jacobs,** The Texas Co., director.

S. Gordon Reese, independent oil operator, Jackson, Miss., has moved to New Orleans, La., where he will be engaged in work in that area.

C. E. Gotterba, general superintendent, natural-gas department of Richfield Oil Corp., has moved from Long Beach, Calif., to Bakersfield where extensive plants and revisions are being built by the company.

Jack M. Fillman, exploitation engineer for Shell Oil Co., Inc., has been made engineer of delta and offshore work for the company at New Orleans.

Dr. Raymond L. Copson has been appointed director of research for Mutual Chemical Co. of America, New York. He is a member of American Institute of Chemical Engineers.

Paul C. Billings has been named unit foreman in charge of the new Paranox plant of Esso Standard Oil Co.'s Bayway, N. J., refinery, and **Richard D. Burt,** New York, has become technical assistant to **John H. Bannon,** head of the chemical products plant.

Victor F. Chancellor, district superintendent of the Cushing, Okla., district, Sinclair Oil & Gas Co., has been transferred to Venezuela where he will be associated with Sinclair Oil & Refining Co.

Henry Gwaltney, tool pusher in the Illinois basin area for A. J. Slagter, Jr., Mount Vernon, Ill., has been moved to Shawnee, Okla., as tool pusher for that area.

C. M. Goodell, assistant district superintendent of the Illinois, Indiana, and Kentucky district, Sinclair Oil & Gas Co., Carmi, Ill., has been transferred to the East Kansas district as district superintendent and will be located at Augusta, Kans.

John W. Stoker has returned from foreign service in Venezuela and is being assigned to the Illinois, Indiana, and Kentucky division, Sinclair Oil & Gas Co., as district superintendent and will be located at Carmi.

L. J. Grossheim has been named manager of the newly established fire and safety department at Shell Oil Co. Inc.'s Deer Park, Tex., refinery. He has supervised fire and safety work at the refinery for some time, but will now be in charge of all fire, safety, plant protection, and hospital duties at the refineries. These activities carried on at the Deer Park refinery and Shell's other refineries have enabled the company to keep its accident frequency record at one-half the national average for all refineries. Grossheim has been with Shell 28 years and has been at Deer Park since 1938.

R. F. Baker, general manager of the domestic producing department, The Texas Co., New York City, was elected a vice president in charge of domestic producing operations at a board of directors meeting held recently. He has spent 33 years in the crude-oil producing department of the company, and succeeds **R. Ogarrio,** who was made chairman of an executive producing committee which will consider crude-oil production policy on a world-wide basis. Other changes made by the directors include: **L. H. Lindeman,** treasurer, elected a vice president in charge of financial matters; **Robert Fisher,** assistant treasurer, elected treasurer succeeding Lindeman; and **A. C. Long,** assistant to the chairman of the board of directors, elected a vice president in charge of all foreign operations in the Eastern Hemisphere. Ogarrio will remain a director and vice president of the company; Lindeman has been with the firm since 1910 in the treasury department; Fisher has been with the company since 1910 and assistant treasurer for the past 10 years; and Long has had 20 years of service with the organization, principally in foreign work.

A. C. LONG

John R. Webb, former field gas engineer, was made superintendent of the gas department, southwestern producing division, Pure Oil Co., succeeding **J. R. McChesney,** who has been transferred to the Chicago office, gas department.

R. C. Heil, petroleum engineer for The Texas Co., has transferred from Salem, Ill., as area engineer, to Marlow, Okla., where he will serve as district mud engineer.

H. D. Brown, foreman of the Cushing, Okla., tank farm of Stanolind Oil Purchasing Co., has been promoted to superintendent, tankage and terminal department, with headquarters in Tulsa, succeeding **R. A. Forsman** who resigned. Brown has served in the tankage department since 1921.

Clarence S. Beesmyer, executive vice president of General Petroleum Corp., Los Angeles, has been appointed by Western Oil and Gas Association as general chairman of the committee in charge of arrangements for the 1950 annual meeting of the American Petroleum Institute in Los Angeles.

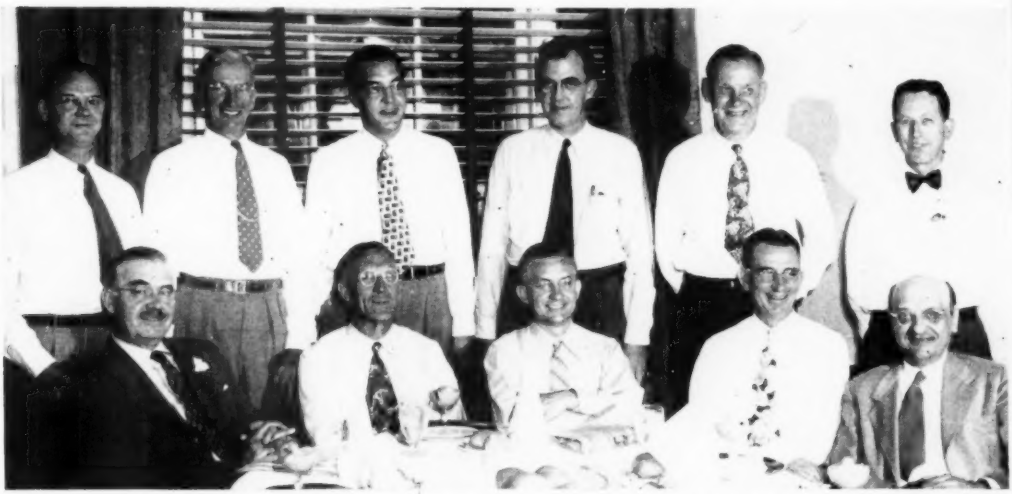
J. G. Stevens, Douglas Oil Co. of California, Los Angeles, was recently promoted to executive vice president and treasurer of the firm.

Fred S. Goddard, production superintendent for Arrow Drilling Co., Tulsa, has joined Sunray Oil Corp. as district superintendent with headquarters at Madison, Kans.

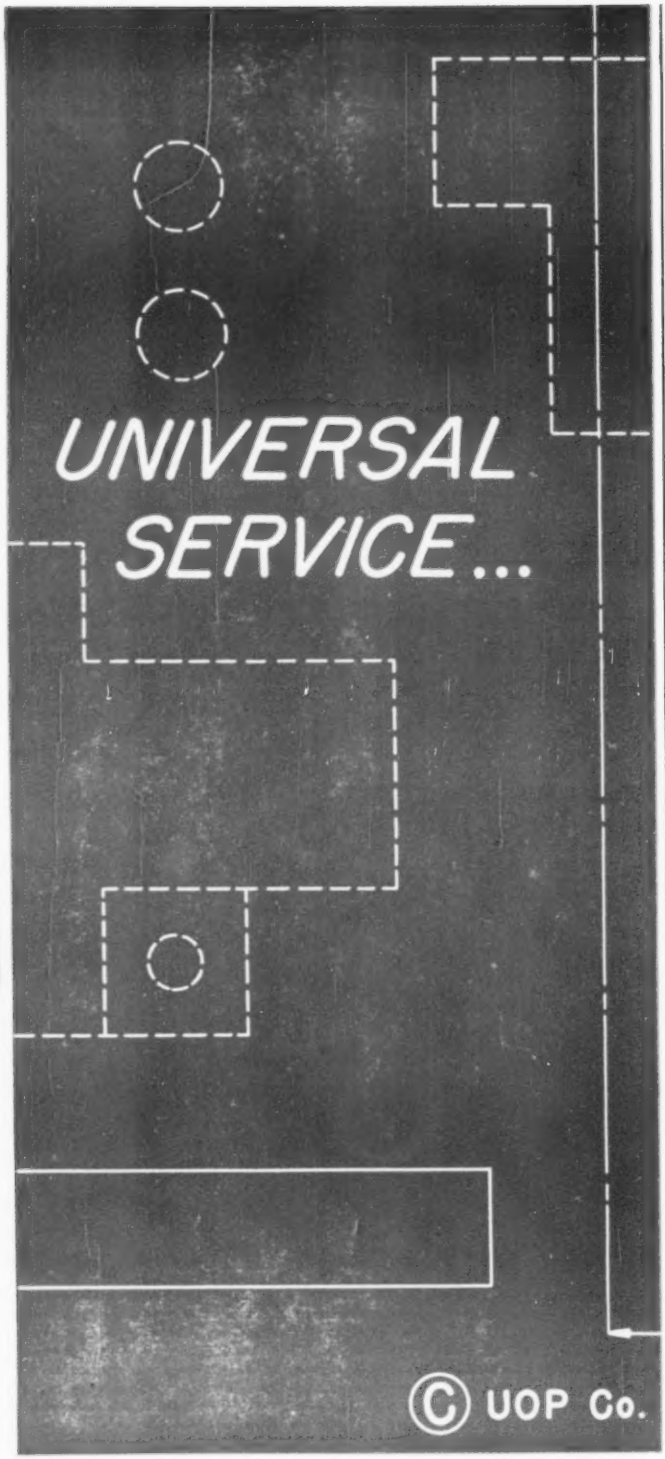
Larry Smith, geologist for Pure Oil Co. in Michigan, has been transferred to the company's offices in Chicago. **W. L. Carr,** geologist for the company in the Rocky Mountain area, has been transferred to Michigan to replace Smith.

Horace L. Temple, engineer for Continental Oil Co. at Ponca City, Okla., has been named petroleum engineer for the company at Moundridge, Kans.

W. A. McAlister, mechanical supervisor for Humble Oil & Refining Co., has been transferred from the North Crowley, Tex., district to the Stratton district (King Ranch gas plant). **Henry Hoffman, Jr.,** petroleum engineer, has been transferred from the Kelsey district to Paradis as district petroleum engineer. Other changes include: **Frederick L. Thompson, Jr.,** petroleum engineer, transferred from London, Tex., to Kelsey, Tex., **Robert**



Members of the Production Research Advisory Committee of the Pennsylvania Grade Crude Oil Association which conferred recently in Pittsburgh with representatives of Pennsylvania State College regarding the association-sponsored secondary-recovery research program. Standing, left to right: C. F. Terrell, Minard Run Oil Co., Bradford, Pa.; G. W. Holbrook, Bradley Producing Corp., Wellsville, N. Y., committee chairman; E. T. Heck, Quaker State Oil Refining Corp., Bradford; Jack Cashell, Preston Oil Co., Columbus, Ohio; J. P. Jones, association director of production, Bradford; C. N. Pfohl, Kendall Refining Co., Bradford. Seated, left to right: Dr. A. W. Gauger, director of the Mineral Industries Experiment Station, Pennsylvania State College, State College, Pa.; D. T. Andrus, Bradford, Pa., Pennsylvanian representative on the Interstate Oil Compact Commission; Dr. J. N. Breston, chief of the association's Bradford laboratory; Prof. D. R. Mitchell, head of department of mineral engineering at The Pennsylvania State College; A. J. Saxe, South Penn Oil Co., Bradford. Absent when the photograph was taken was R. B. Bossler, Brundred Oil Corp., Oil City, Pa.



Deep Rock Modernizes Cushing Refinery

By W. J. Carthaus

Vice President in charge of Manufacturing and Research, Deep Rock Oil Corporation

The installation of a 5,000 barrel fluid catalytic cracking unit at our Cushing, Okla., refinery will be one of the major steps in a program of modernization and expansion which is designed principally to produce superior quality products and more efficiently. Doing this will enable us to satisfy the requirements of any internal combustion engine likely to be produced commercially for some time.

W. J. Carthaus

Deep Rock pioneered in thermal cracking in the Mid-Continent field more than a quarter century ago with one of the earliest installations of a thermal unit designed by Universal Oil Products Company. The new fluid catalytic cracking unit, which will include a gas concentration system and feed preparation facilities, is being designed by UOP.

Single Column Unit

The cat cracker will follow UOP's improved design with reactor and regenerator incorporated in a single column. It will produce catalytically cracked gasoline, domestic burner oil and cycle stock. In addition, crude facilities will be increased through the installation of a crude distillation unit.

The gas concentration system will depropanize and debutanize the catalytically cracked gasoline, and at the same time prepare feed stock for the catalytic polymerization unit. The feed preparation system for the cat cracker will consist of a combination of vis-breaking and vacuum distillation designed to give maximum flexibility.

It is interesting to note that the installation of the cat cracker will not mean the retirement of the thermal cracking plant from service, although its operation will be modified.

The present thermal cracker is a two-coil unit with rated capacity of 5,000 barrels per day. Under the new set-up the heavy oil heater will be converted to vis-breaking service as part of the cracker's feed preparation system and the light oil heater will be changed for single coil operation to crack the heavy cycle stock from the cat cracker if that should prove desirable, as well as any other available cracking stock.

To Double Poly Unit

We have at the present time, a catalytic polymerization unit which processes the gas from the thermal cracker. It

(Advertisement)

will be necessary to practically double the capacity of the poly unit, now producing about 160 barrels per day of 82 octane (Motor Method) polymer gasoline, in order to take care of the additional gas produced in the cat cracking operation. When increasing the size of this poly unit, additional provision will be made for the recovery of propane and butane from the poly plant effluent, to be marketed as LPG. The LPG facilities will utilize, in addition to two new vessels, two existing flash chambers which were formerly part of the original small thermal cracker.

Expansion of our crude capacity and the installation of the cat cracker, necessitates considerable change throughout the plant. All main transfer lines will be replaced with lines of greater capacity and 200,000 barrels of additional tankage must be constructed. To maintain a constant check on our increased operations, and to assure uniform high quality, we plan to virtually double the size of our control laboratories.

More steam is another necessity and our plans call for the installation of an additional boiler to deliver 40,000 pounds of steam per hour. We are also confronted with a great increase in our water requirements. Our boiler feed water, presently amounting to 350,000 gallons per day, will be raised to about 500,000 gallons, all drawn from the Cushing municipal system.

Complete cooperation on the part of the city has been pledged and we are assured of the additional 150,000 gallons we will need. Our process cooling water is drawn from the Cimarron River and it will be necessary to enlarge our lines and pumping facilities to handle an increased volume of water.

Enlarged Modern Office Building

Better working conditions for our refinery office staff are being provided and the existing building is being greatly enlarged and completely modernized. Plans call for the installation of the latest type of air conditioning throughout the building.

New Research Laboratory

One part of our expansion program which we consider of major importance is the construction of an air conditioned building to house a research and development laboratory. This is to be entirely independent of the control laboratory so that research men will not be diverted from their work for plant trouble shooting or to solve purely operational problems. This research and development service will be divided into four parts including research, technical service to customers, new product development and engine laboratory research on fuels and lubricants.

The Cushing refinery is located on the Great Lakes pipeline and our gasoline moves to market in that way. Many of our special products such as technical naphthas and lubricating oils, however, must be transported by rail. To facilitate the loading of such products we are replacing our present loading rack with a more efficient installation.

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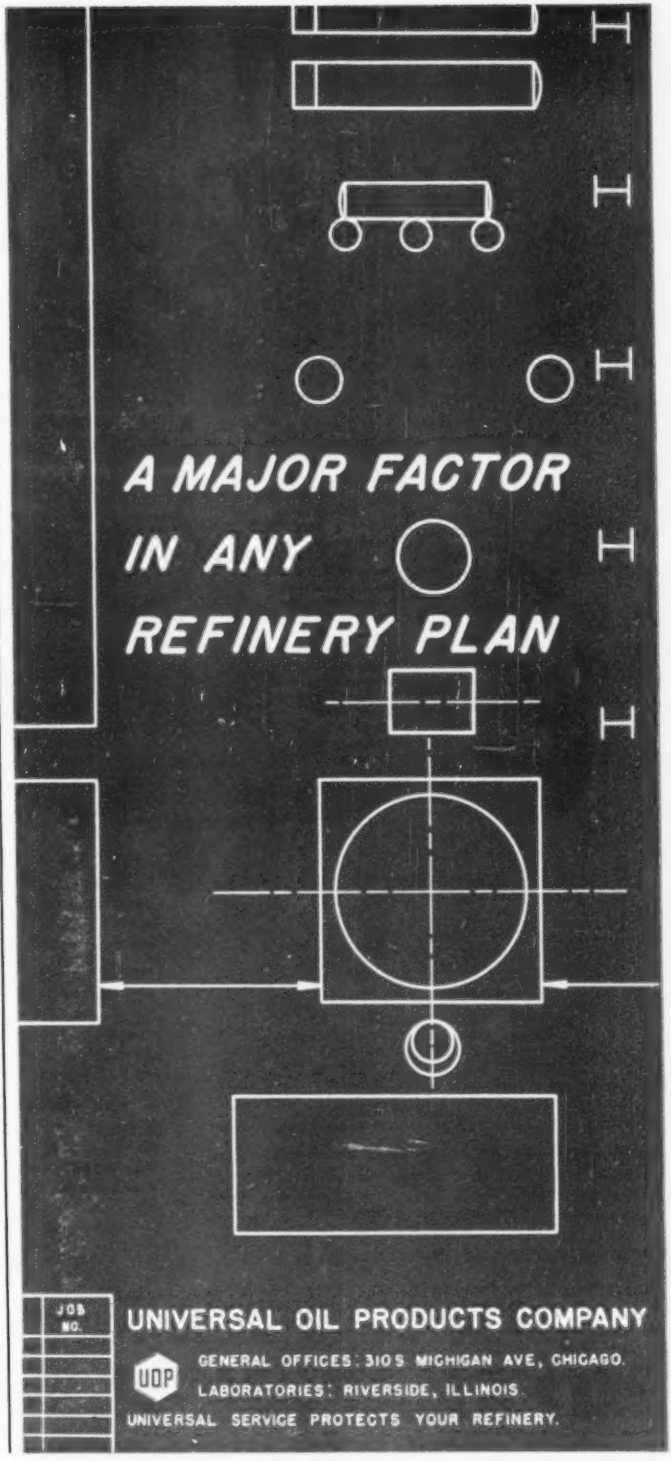
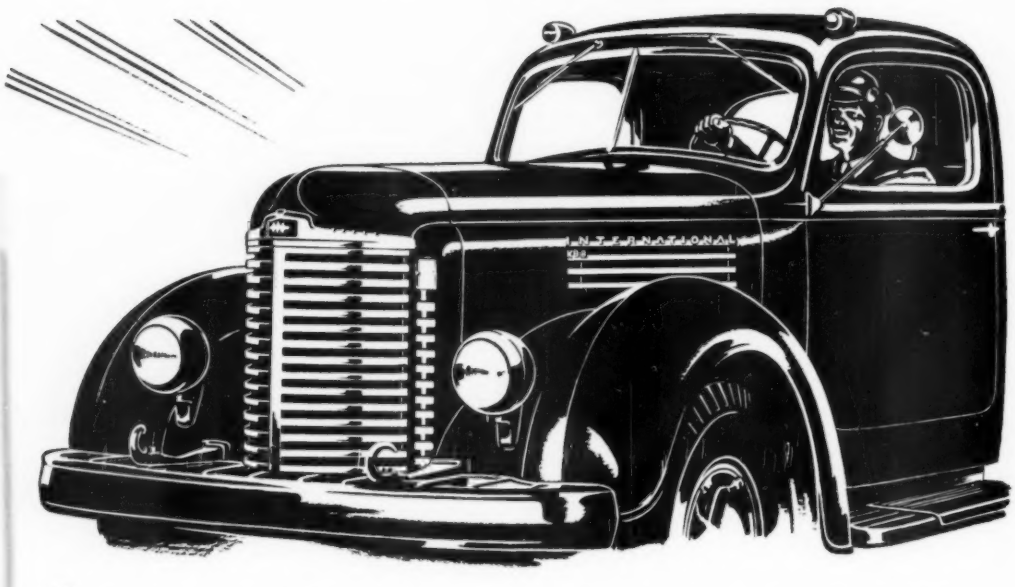


First in heavy-duty truck sales for 17 straight years!



America's most exacting truck buyers AGAIN give Internationals a vote of confidence!

Actual 1948 registration figures for new trucks of 16,001 pounds and greater GVW ratings show this nationwide preference for Internationals:

Internationals	**26.4%**
Truck "B"	**14.3%**
Truck "C"	**13.3%**

This marks the 17th successive year that Internationals have led in heavy-duty truck sales! Would men who buy on a basis of performance give a No. 1 rating to any truck unless it gave them a No. 1 value?

Outstanding value—right down the line! The same basic values that have kept Internationals first for 17 straight years in the heavy-duty field, are yours in any International Truck model. Heavy, light, or medium-duty, your International Truck is *all* truck. There's no compromise with passenger car design.

Trucks built to meet your requirements. Among the 22 basic International Truck models and 1,000 different truck combinations, there's a truck that's right for *your* job. In the range of gross weight ratings, from 4,400 to 90,000 pounds, you get the power, the frames, the axles you need for efficient hauling.

PLUS—the nation's largest exclusive truck service organization! 4,700 International Truck Dealers and 170 Company-owned Branches are ready with trained mechanics, precision-engineered replacement parts and low-cost rebuilt exchange units . . . ready to keep your International rolling at peak efficiency.

A truck transportation engineer is ready to help you! Call your nearest International Dealer or Branch, and find out how Internationals can step up the efficiency of your hauling. Trained International Truck transportation engineers will help you analyze your job—recommend a truck to lick it. If you're interested in profits, you'll call *soon!*

International Harvester Builds McCormick Farm Equipment . . . Farmall Tractors . . . Industrial Power Motor Trucks . . . Refrigerators and Freezers

Tune in James Melton and "Harvest of Stars," NBC, Sunday afternoons

INTERNATIONAL TRUCKS

INTERNATIONAL HARVESTER COMPANY • CHICAGO

L. Mills, assistant district superintendent, Galveston Bay district, moved to the petroleum engineering division at Houston as supervising engineer; **Paul L. McGee,** assistant district superintendent at London, transferred to the Goose Creek district as petroleum engineer; **John C. McDuffee, Jr.,** associate petroleum engineer, moved from East Texas division at Tyler to petroleum engineering division at Houston as petroleum engineer; and **James W. Roark,** assistant district chief clerk at North Katy, transferred to marine equipment division in Houston.

E. F. Schwarzenbek, M. W. Kellogg Co., Jersey City, N. J., has been named director of the petroleum and chemical research laboratory of the company.

William R. Waggoner, gas superintendent for Pure Oil Co., has been moved to Worland, Wyo., where he will serve as gas superintendent of the Rocky Mountain division of the company, concentrating on construction and operations.

Hubert L. Drake has been placed in charge of the newly organized purchasing department of Stanolind

H. L. DRAKE

C. D. WELLS

Pipe Line Co., Tulsa, and will be assisted by **Charles D. Wells,** who transfers from the Stanolind Oil & Gas Co. The new department will have charge of procurement of all Stanolind Pipe Line Co. requirements, both locally and in its operational areas. Procurement for the pipe-line company was performed jointly with Stanolind Oil & Gas until the new unit was organized. Drake, a senior engineer, advanced to his present post from a job he took with the company in 1933 as a laborer. He is a graduate of Oklahoma A. & M. College. Wells has been a purchaser since 1946, and joined Stanolind Oil & Gas 14 years ago. He is a former employe of Wyoming Corp., subsidiary of Prairie Oil & Gas Co.

John L. Cosgrove and **Michael J. Flynn,** veteran employes at Tide Water Associated Oil Co.'s Bayonne, N. J., refinery, have retired from active service. Flynn had been with the company since 1918, serving in various capacities including controlman at the cracking coils, and Cosgrove served in the high pressure stills section.

Donuil Hillis, geologist for Fullerton Oil Co. at Casper, Wyo., has been transferred to the Hobbs, N. M., area.

George F. James, a member of the legal staff of Standard-Vacuum Oil Co. since 1944, has been appointed treasurer of the company effective August 1. He succeeds **Frank H. Carlson** who will join the board of directors of Vacuum Oil Co., Pty., Ltd., Australian subsidiary. Before joining the New York staff of Standard-Vacuum Carlson served in an executive capacity in Australia for 16 years.

Lawrence C. Stratton, district superintendent for Sinclair Oil & Gas Co.'s East Kansas district, has been transferred to Cushing, Okla., district and will be located at Drumright, Okla.

SHIFTS—

C. A. Miller, superintendent, Kerr-McGee Oil Industries, Inc., Powell to Casper, Wyo.; **Glen M. Ruby,** engineer, Exploration Contractors, Inc., Salt Lake City to Laguna Beach, Calif.; **J. C. Morris,** foreman, Barnsdall Oil Co., Barnsdall, Okla., to Mineral Wells, Tex.; **L. P. Foote,** superintendent, Ohio Oil Co., Bakersfield to Houston; **G. C. Chester,** engineer, Standard Oil Co. of California, San Francisco to Berkeley; **Wallace A. Howes, Jr.,** engineer, Stanolind Oil & Gas Co., Austin to Powell, Wyo.; **L. B. Grissom,** foreman, Ohio Oil Co., Loogootee to Salem, Ill.; **M. P. Edgley,** superintendent, Gulf Oil Corp., Lansdown to Upper Darby, Pa.

Harold Hoopman, engineer, Ohio Oil Co., Grass Creek, Wyo., to Casper, Wyo.; **Robert J. Butler,** geologist, Purcell, Okla., to Manhattan, Kans.; **George E. Briggs, Jr.,** engineer, Stanolind Oil & Gas Co., Wewoka to Spaulding, Okla.; **Roy E. Campbell,** engineer, Stanolind Oil & Gas Co., Tulsa to Levelland, Tex.; **F. M. Carroll,** engineer, Shell Oil Co., Inc., Tulsa to Marshall, Ill.; **P. A. Johnson,** engineer, Paraffine Co., Inc., Burlingame, Calif., to New York; **L. E. Kesselman,** engineer, San Bernardino to Long Beach, Calif.

J. W. Williams, superintendent, Falcon Seaboard Drilling Co., Corpus Christi to Lafayette, La.; **D. H. Huff,** superintendent, Arkansas Fuel Oil Co., Longview to Kermit, Tex.; **Ronald Pruet,** engineer, Gulf Oil Corp., Lubbock to Ranger, Tex.; **J. Huey Morel,** chemist, Esso Standard Oil Co., Baton Rouge to New Roads, La.; **H. N. Lewis,** superintendent, Ohio Oil Co., Bridgeport, Ill., to Cement, Okla.; **S. T. Shiang,** engineer, Universal Oil Products Co., Chicago to Floral Park, N. Y.

DEATHS

Henry S. Wilson, pipe-line foreman for Morrison Construction Co., was killed in an accident June 20 at Cuba, N. M.

Clyde N. Arnold, 48, an assistant engineer with the Bayway refinery of Esso Standard Oil Co. in Linden, N. J., died June 18 in Rahway, N. J.

M. W. Bahan, 86, one of the founders of Lone Star Gas Co., died in Fort Worth June 18.

Stephen P. Fatula, 56, construction division employe, Bayway refinery, Esso Standard Oil Co., died in Linden, N. J., June 21.

Roy P. Bateman, 56, refrigeration engineer in the wax plant at Continental Oil Co.'s Ponca City, Okla., refinery, died June 22.

Raymond D. Dundore, 45, manager of training for the New York division of Gulf Oil Corp., died June 22 in New York.

B. L. Pinson, 24, Wichita Falls, Tex., member of a drilling crew for D. H. Bolin Drilling Co., was killed in a rig accident June 25 near Archer City, Tex.

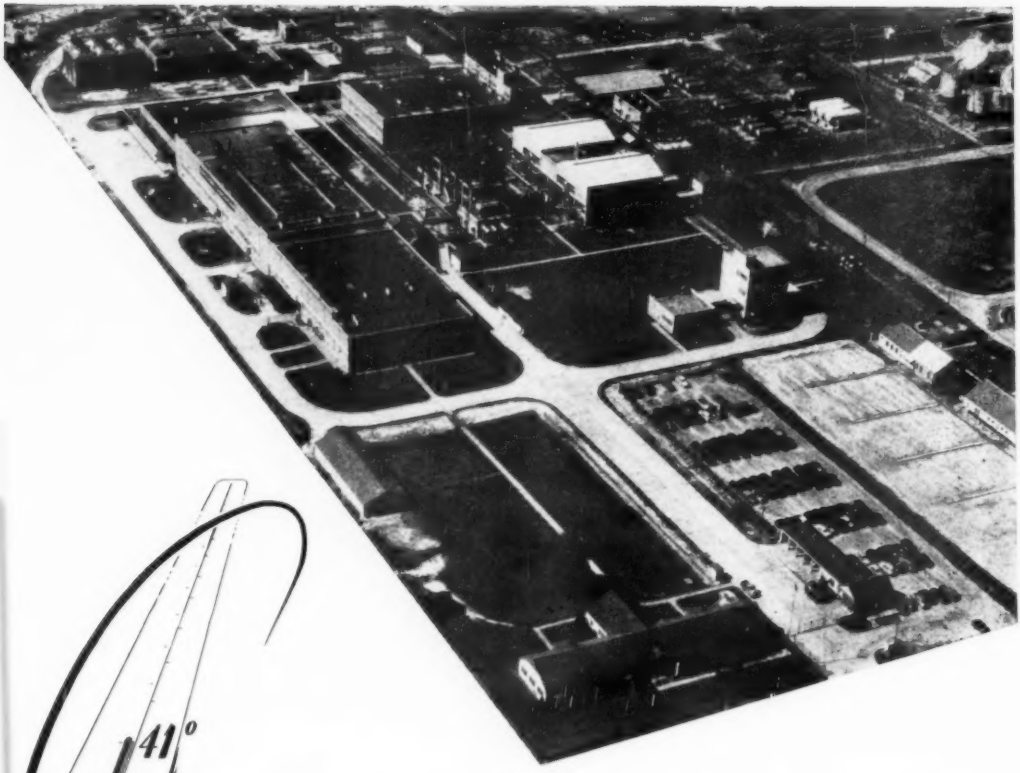
Francis E. Kepple, 59, partner in the oil-industry accounting firm of W. O. Ligon Co., died June 18 at Kennedale, Tex.

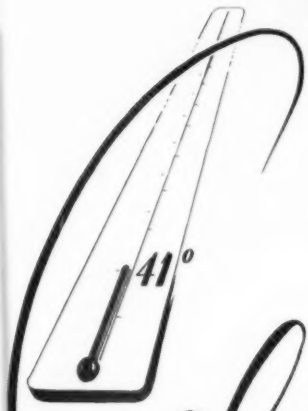
Frank Gawron, 76, Scotch Plains, N. J., retired foreman for Esso Standard Oil Co. at the Bayonne, N. J., refinery, died June 18.

Woodrow W. Shannon, 32, employe of the Onyx Refining Co. at Abilene, Tex., died June 24.

W. A. (Tex) Thornton, 57, well known wild well and explosives expert, died June 23 in Amarillo, Tex.

Albert Mendelsohn, 80, founder and former president of Parker Refining Co., died June 20 in Cleveland.





Cold Rubber . .

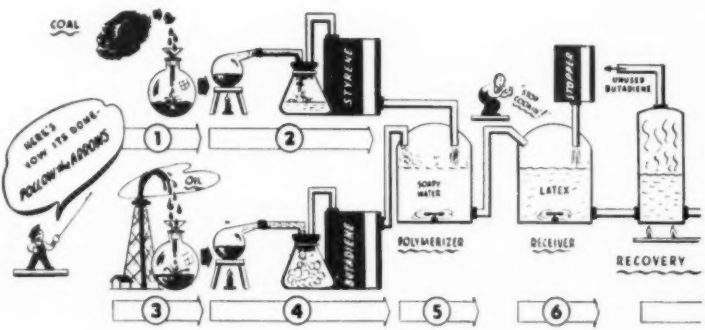
by Leigh S. McCaslin, Jr.
District Editor

Baton Rouge plant of 60-million-pound annual capacity polymerizes butadiene and styrene at 41° F., to produce new top-quality product.

THE first plant to convert 100 per cent to the production of "cold rubber"—the new synthetic which exceeds the quality of the best natural rubber—has been put into full operation at Baton Rouge by Copolymer Corp.

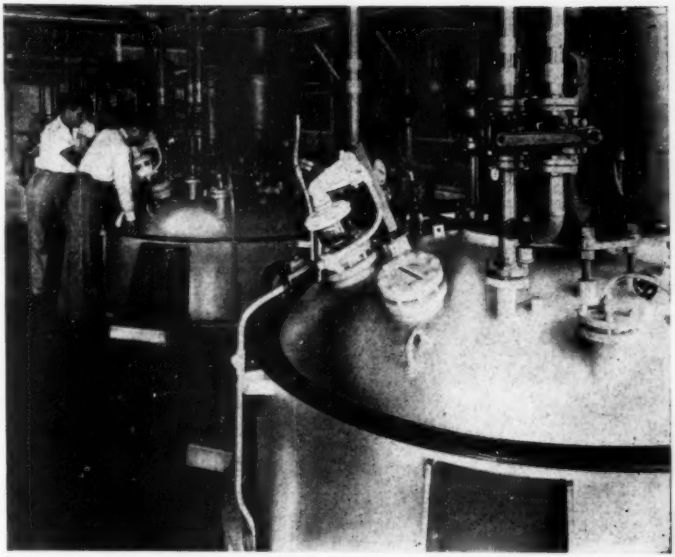
Commercial production of this new synthetic rubber first began at the government-owned plant in February 1948, but full capacity was reached only recently. Eight medium-sized tire companies—operating as Copolymer Corp.—run the plant (annual capacity 60,000,000 lb.) for Rubber Reserve Co., an agency of Reconstruction Finance Corp.

Copolymer Corp. representatives claim these major advantages for cold



Opposite page: Aerial view of Copolymer Corp.'s plant, Baton Rouge, now converted completely to production of cold rubber—America's new man-made material which increases tire mileage by at least 30 per cent

Right: Battery of reactors in the new rubber plant. They mix the cold-rubber ingredients at temperature of 41° F. From the reactors cold rubber emerges as a milky latex, which is next coagulated and washed free of all chemicals



rubber (so named because it polymerizes at 41° F. as contrasted with 122° F. for GR-S synthetic rubber):

1. Cold rubber sets up a keen competitive situation tending toward lower natural-rubber prices.

2. If the replacement passenger tires in 1948 had been made with cold-rubber treads, American motorists would have saved over $205,000,000 in this one year alone.

3. Increased safety will result as the nonskid tread will last longer.

4. With a longer-wearing tire, the motorist can run more miles, get more comfort by carrying a lower air pressure, and drive faster with a greater degree of safety.

A. L. Freelander, president of Copolymer, asserts that the manufacture of cold rubber marks the first time "that the quality of the best natural rubber has been exceeded, let alone equaled. Cold rubber means that the United States now has an American-made rubber that not only makes this hemisphere independent of foreign sources, but provides a rubber of a quality unequaled by any natural source anywhere in the world. And further, under present operating conditions, it costs practically no more to produce than the well-known universal type called GR-S, and costs no more to process through the tire plants."

Fig. 1 is a graphic presentation of the manufacture of cold rubber at the Copolymer plant. The flow of materials is shown as a stream starting with the raw materials and going through the entire process to the finished rubber. The ammonia and the coolant solution in the refrigeration system each circulates in a closed system of its own, while the excess styrene and butadiene which are charged in the reactors circulate in and out of the main stream.

Butadiene and styrene, the principal ingredients of the rubber, are received by pipe line or tank car. They are stored at the tank farm and blended with recycle material from the recovery units.

Chemical Preparation Building

The butadiene-styrene copolymerization reaction takes place in soapy water. Small amounts of activator and catalyst solutions are added to speed up the reaction, also a modifier to control the toughness of the finished rubber. When the reaction has progressed to the desired degree it is arrested by the use of a shortstop solution. Later in the process an antioxidant is added to the rubber to improve its aging properties. The necessary solutions are made in the chemical-preparation building.

The raw materials used in a reactor batch are carefully measured by

Copolymer Corp. History and Corporate Setup

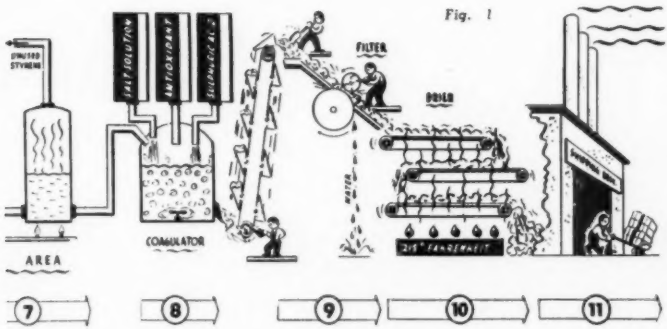
COPOLYMER CORP. is unusual in its corporate setup. Even before Pearl Harbor, when synthetic rubber was receiving government attention, rubber manufacturers—especially the smaller ones—were interested in what their position would be in the event American-made synthetic rubber became a reality. After Pearl Harbor, the necessity for American-made rubber became a "must"; consequently, in 1942 Copolymer Corp. was organized.

The neutral name "Copolymer" represents the rubber process of copolymerization being a combination of two chemicals or polymers. The corporation is extraordinary because each of the constituents is a competitor of the others. All constituents have equal participation. Each one has its own class of stock and elects one director.

Copolymer was the first to put into operation, in May 1948, the present government dual-integrated plants. With the conversion of the Baton Rouge plant, it also has the distinction of operating the first plant to be converted 100 per cent to the production of cold rubber. Constituent companies of Copolymer Corp. are: Armstrong Rubber Co., West Haven, Conn.; Dayton Rubber Co., Dayton; Gates Rubber Co., Denver; Inland Rubber Corp., Chicago; Lake Shore Tire & Rubber Co., Des Moines; Mansfield Tire & Rubber Co., Mansfield, Ohio; Lee Rubber & Tire Corp., Conshohocken, Pa.; and Sears, Roebuck & Co., Chicago.

The accompanying article is based on addresses given at the recent formal opening of the Copolymer Corp. plant at Baton Rouge by A. L. Freelander, C. M. Hullings, and E. C. Reed, of Copolymer, and W. B. Reynolds of Phillips Petroleum Co.

Fig. 1



means of meters and weigh scales, cooled from room temperature to just above freezing in the feed-stock cooler and charged to a reactor. The batch temperature is kept low by circulating coolant through the reactor jacket. When the batch is finished it is pumped to one of the blowdowns. The shortstop solution is added to the latex at the reactor pumpout pump. The latex in the blowdowns is heated with live steam. It then flows to the recovery building by pressure differential.

Recovery

Latex from the blowdowns is fed continuously to the flash tanks where the excess butadiene is vaporized at reduced pressures. The butadiene vapors are compressed, liquefied, and returned to the tank farm for blending. The excess styrene is then removed in the columns by steam stripping under vacuum. The styrene and steam from the column are condensed and separated. The recycle styrene is also returned to the tank farm.

The stripped latex is pumped from the bottom of the columns to the latex blend tanks in the process building.

Measured quantities of latex, antioxidant solution, brine, and dilute acid are mixed in the coagulation pumps. This causes the rubber to separate from the latex. The rubber crumb is screened to remove the serum and washed on a rotary filter. The rubber is then shredded in a hammer mill and blown to a dryer where the moisture is removed. The dry rubber is compressed into 75-lb. bales, dusted, and packed in paper bags for shipment.

Initial Production Problems

Shortstopping was one of the many trials and difficulties in the early commercial production of cold rubber. It was found that conventional shortstops were not powerful enough to arrest the conversion at about 60 per

(Continued on page 84)

Picture Story: Cold-Rubber Research and Butadiene Manufacture

1—RESEARCH LABORATORY AT PHILLIPS, TEX.—Phillips Petroleum Co. research laboratory where much research on cold rubber has been carried on. The car in the foreground is one of several used by the company for road testing cold-rubber tires.

2—PILOT PLANT.—Cold-rubber pilot plant at Phillips, Tex., designed in 1942 and placed in operation in 1944. This was the first refrigerated pilot plant in the country.

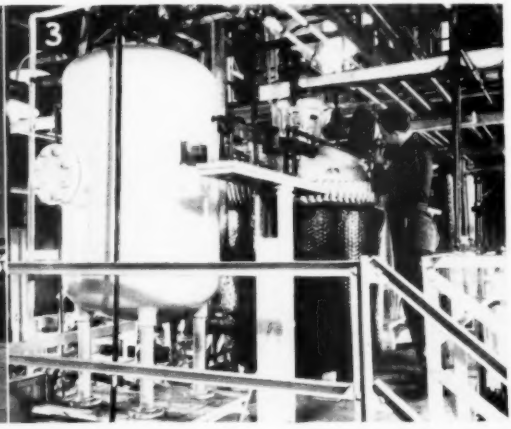
3—PREPARATION OF RAW MATERIALS.—View of soap makeup tank and monomer weigh tank.

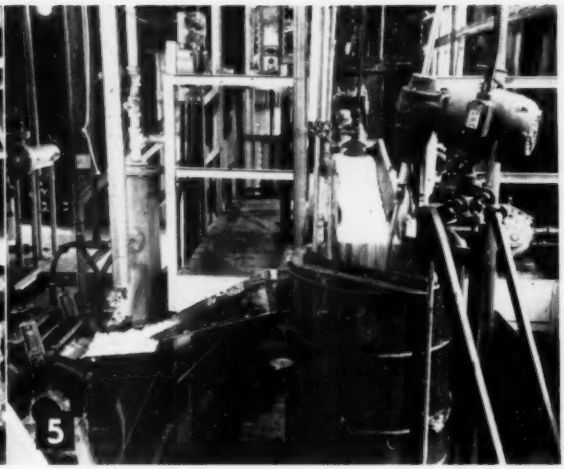
4—POLYMERIZATION REACTOR.—Polymerizations are carried out at temperatures down to 0° F. in this 250-gal. refrigerated reactor. Cold methanol solution is circulated in the jacket of the reactor to maintain the batch at the desired temperature. Here an operator is adding activator solution to the previously charged reactor after the batch has been reduced to the desired polymerization temperature. No reaction occurs until the activator solution is added.

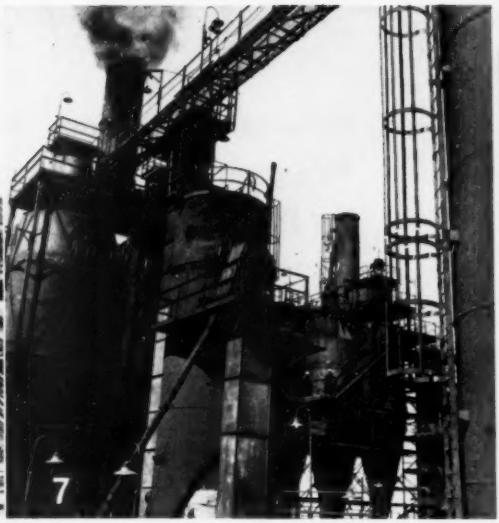
5—LATEX COAGULATION.—Latex from the blend tank is coagulated in a continuous operation. Rubber crumbs formed in the upper tank spill onto a screen which separates the fluid. The crumbs are washed by water sprays and tumble into the "soap conversion" tank below where any remaining soap is converted into fatty or rosin acid. The crumbs then tumble onto the rotary filter at lower left where the excess water is squeezed out.

6—TERTIARY MERCAPTAN PLANT.—Mercaptans are essential ingredients in the cold-rubber process. The expensive primary mercaptans derived from cocoanut oil, which have been used for GR-S production, have been abandoned in the cold-rubber process in favor of economical, efficient tertiary mercaptans derived from petroleum. This Phillips mercaptan plant produces the mercaptans Sulfole and MTM used almost exclusively in the cold-rubber process.

7—FURNACE-BLACK PLANT.—The success of cold rubber was due in substantial measure to its combina-

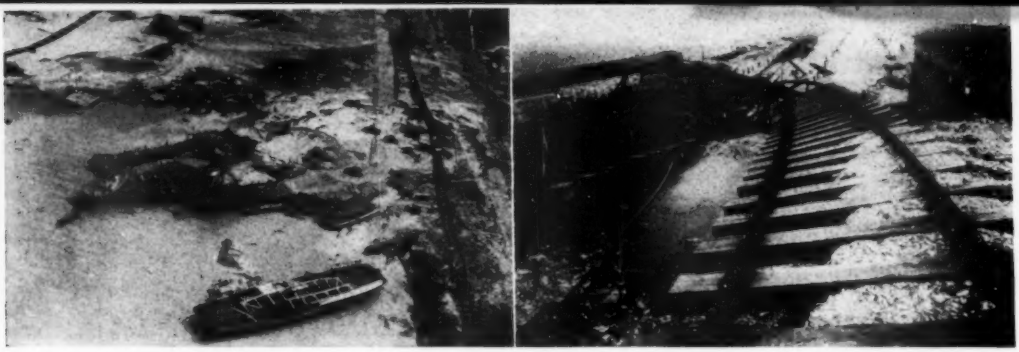






tion with a new furnace black introduced by Phillips and known commercially as Philblack O. Here is shown a section of the plant located at Borger, Tex. This product is now being produced at an annual rate exceeding 70,000,000 lb. This furnace-black plant is now the largest-producing furnace-black plant in the world having an annual capacity of 185,000,000 lb.

8—PLAINS BUTADIENE PLANT.—This 56,000-ton-per-year butadiene plant is located at Borger, in the heart of the natural-gas fields, is operated for the Government by Phillips. Butadiene is produced by the dehydration of normal butane. The butane is obtained from natural gas. Proved reserves of normal butane are sufficient to produce more than 80,000,000 tons of synthetic rubber or enough to supply current requirements for more than 200 years.



Left: Why high safety factors and well-thought-out hurricane plans can pay out. Note damage to boats and shore facilities resulting from hurricane waves, winds, and storm tide. Right: Difficulty in estimating hurricane wave forces in design is illustrated by destruction to the Galveston Causeway during the 1915 hurricane. Forces exerted by breaking waves are not yet determinable by theoretical means.

HURRICANES

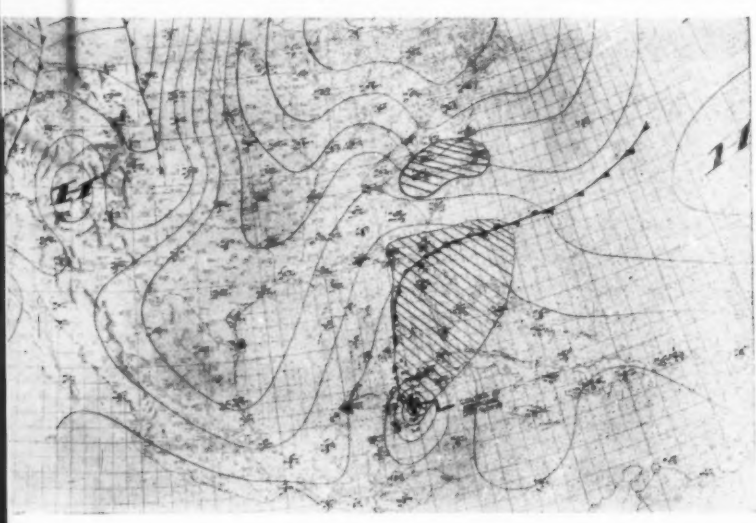
Forecasting Periods of Occurrence of Tropical Weather Violence Vital in Offshore Operations To Protect Personnel and Expensive Equipment

by Karl Shisler*

WHILE the design of most offshore drilling platforms and tenders now in use embodies a safety factor based on assumed hurricane wave and wind conditions, there is not definite assurance at the present time that these safety factors are adequate, simply because there are no empirical data or theoretical means by which the forces exerted by breaking waves on the offshore equipment can be determined. Until such time as the offshore equipment is subjected to the action of well-developed hurricanes, or until actual measurement of breaking wave forces or development of theoretical means of approaching this problem have been accomplished, the question remains as to whether failure of the equipment during a severe hurricane will occur. For this reason, safety of personnel demands evacuation of offshore rigs in anticipation of hurricane conditions.

There are two complicating circumstances which make the decision of whether or not to evacuate the rigs difficult to make. The first circumstance is the desire of management to continue offshore operations as long as is consistent with safety. The second circumstance is the nature of meteorological and oceanographic forecasting, and the present organi-

*Meteorological consultant, A. H. Glenn & Associates, New Orleans Airport, and 7810 Gateway Boulevard, S. E., Washington.



The hurricane of October 3-6, 1948, shown on a surface weather map, one of the many hurricane-forecasting tools which include upper-air charts, radiosonde observations, aircraft reconnaissance, automatic weather stations, radar, and microseisms

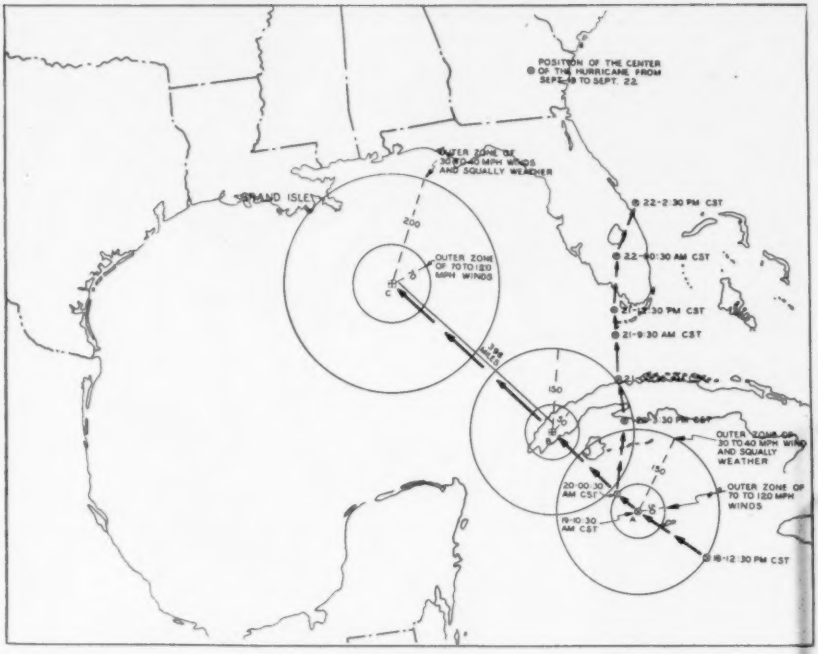

POSITION OF THE CENTER OF THE HURRICANE FROM SEPT. 19 TO SEPT. 22
OUTER ZONE OF 30 TO 40 MPH WINDS AND SQUALLY WEATHER
GRAND ISLE
200
OUTER ZONE OF 70 TO 120 MPH WINDS
22-2:30 PM CST
22-10:30 AM CST
21-9:30 PM CST
21-9:30 AM CST
150
OUTER ZONE OF 30 TO 40 MPH WIND AND SQUALLY WEATHER
OUTER ZONE OF 70 TO 120 MPH WINDS
20-00:30 AM CST
19-10:30 AM CST
19-12:30 PM CST

Fig. 1 — Schematic diagram of a hurricane moving from the Yucatan Channel into the Grand Isle, La., area

Velocity of hurricane ... 18 m.p.h.

Time required for center of hurricane to move from Point A to Point B ... 12 hours

Time of arrival at Grand Isle of the first swell which was generated at Point B ... 35 hours

Height of swell originated at Point B and arriving at Grand Isle ... 1.6 ft.

Time required for center of hurricane to move from Point B to Point C ... 22 hours

Waves at Grand Isle when hurricane arrived at Point C would average 3 to 4 ft. and increase rapidly to 29 ft. 9 hours later

Time available for evacuation with present position of hurricane at Point A to its arrival at Point C ... 34 hours

zation of the Hurricane Warning Service, a joint operation of the U. S. Weather Bureau, Air Force, and Navy, which provides the weather data utilized in all hurricane warnings.

The main question arising, in the event of a hurricane, is to select the proper times to discontinue drilling, pull pipe, secure the rig, and anchor any barges or L.S.T.'s which must be left to face the onslaught of high waves and terrific wind velocities.

While supervisory personnel will be thoroughly acquainted with the evacuation procedure which will partially provide the basis for the decision regarding the time of evacuation, they

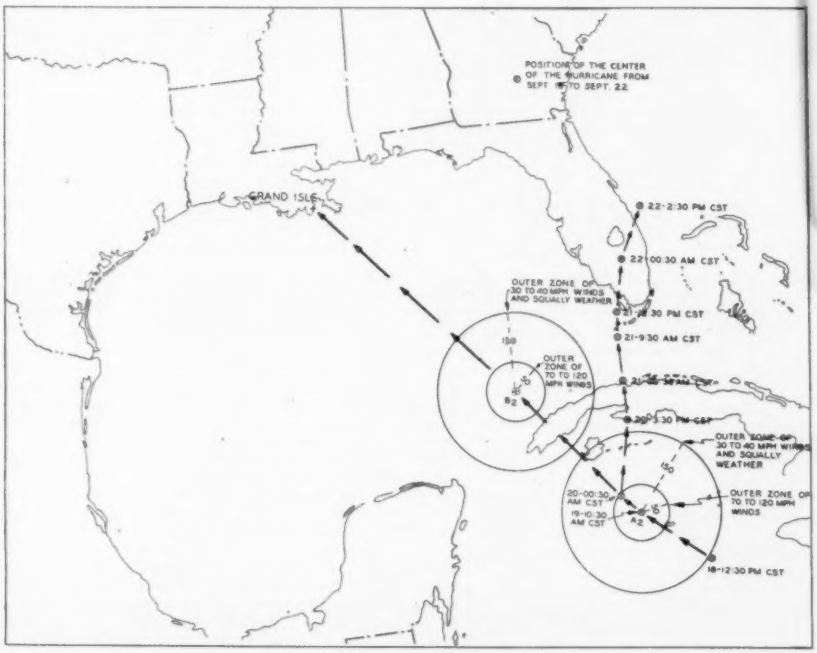

POSITION OF THE CENTER OF THE HURRICANE FROM SEPT. 19 TO SEPT. 22
GRAND ISLE
22-2:30 PM CST
22-10:30 AM CST
OUTER ZONE OF 30 TO 40 MPH WINDS AND SQUALLY WEATHER
21-9:30 PM CST
21-9:30 AM CST
150
OUTER ZONE OF 70 TO 120 MPH WINDS
OUTER ZONE OF 30 TO 40 MPH WINDS AND SQUALLY WEATHER
20-00:30 AM CST
19-10:30 AM CST
OUTER ZONE OF 70 TO 120 MPH WINDS
19-12:30 PM CST

Fig. 2—Schematic diagram of a hurricane moving from the Yucatan Channel into the Grand Isle, La., area

Velocity of hurricane ... 11 m.p.h.

Time required for the center of the hurricane to move from Point A_2 to Point B_2 ... 28 hours

Height of swell generated at Point B_2 ... 5.8 ft.

Time required for 5.8-ft. swell to travel from Point B_2 to Grand Isle ... 27 hours

Time available for evacuation with position of hurricane at Point A_2 to first arrival of 5.8-ft. swell at Grand Isle ... 55 hours

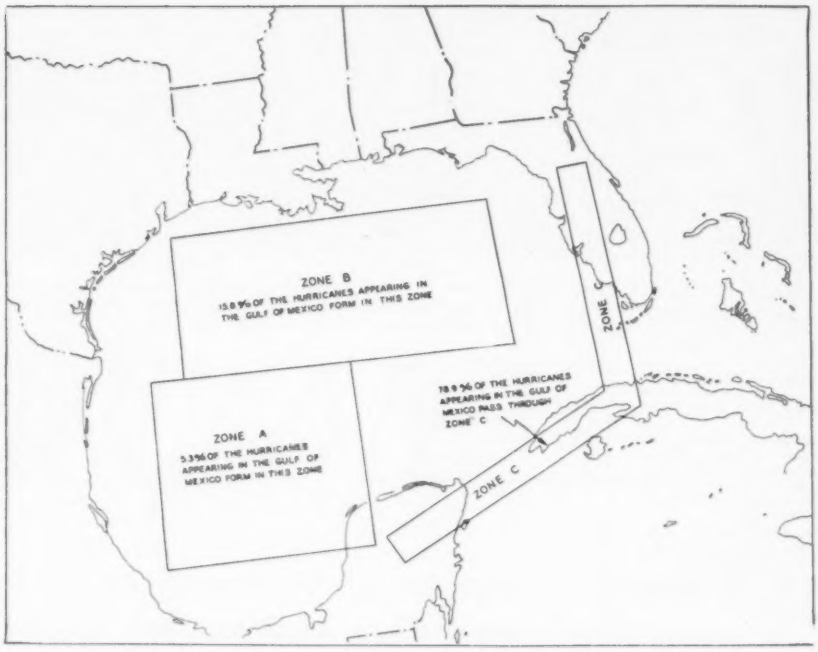

ZONE B
15.8 % OF THE HURRICANES APPEARING IN THE GULF OF MEXICO FORM IN THIS ZONE
ZONE A
5.3 % OF THE HURRICANES APPEARING IN THE GULF OF MEXICO FORM IN THIS ZONE
18.9 % OF THE HURRICANES APPEARING IN THE GULF OF MEXICO PASS THROUGH ZONE C
ZONE C
ZONE C

Fig. 3—Zones of origin of hurricanes affecting the Gulf of Mexico

Number of hurricanes per year originating in Zone B over a 10-year period:

1933	0
1934	1
1935	0
1936	0
1937	0
1938	0
1939	0
1940	0
1941	1
1942	0
1943	1
Total	3

Number of hurricanes per year originating in Zone A over a 10-year period:

1933	0
1934	0
1935	0
1936	0
1937	0
1938	0
1939	0
1940	0
1941	0
1942	0
1943	1
Total	1

will not as a rule, be familiar with the problems facing the meteorologist in preparing tropical disturbance advisories. Since the decision to evacuate must be based on the meterologist's advice, it is appropriate to consider his problems, also.

The meteorologist preparing tropical disturbance advisories, under which heading is included hurricanes, which are defined as tropical rotational disturbances with wind speeds in excess of 74 m.p.h.; tropical storms, those with wind speeds from 25 to 75 m.p.h.; and tropical low-pressure areas, or zones conditionally favorable for the development of either a hurricane or tropical storm, is dependent upon the efficient operation of an extremely complicated international weather-observing and communication network, and he is limited in his predictions by a theoretical background which provides only a partial understanding of the complex causes of movement and intensification of tropical disturbances.

To understand the complexity of the weather observation and communication network in operation during hurricane periods, one must visualize hundreds of weather observers making surface and upper-air observations simultaneously in the United States, Mexico, the West Indies, the Antilles, in South America, on ships of many nations, and in commercial and service aircraft. These observations are than encoded by a procedure which has been agreed upon internationally, and transmitted to various centers for redistribution within a few hours on U. S. Weather Bureau teletype circuits.

The coded observations are received by teletypes in forecasting offices and are rapidly decoded and plotted on weather maps. The meteorologist then analyzes these maps, which provide a three-dimentional symbolic model of the distribution of temperature, pressure, moisture, and descriptive weather conditions in the atmosphere a few hours previously. Should there be any failure of the complex international weather communications network, or, as happens more frequently, a scarcity of observations in some critical area, the meteorologist is severely handicapped.

Tropical-Disturbance Advisory

In preparing his tropical-disturbance advisory, the meteorologist may feel quite certain that his prediction will prove correct. Other times the analyzed data may be scant or indicate two or more possibilities in the future development of weather conditions, each apparently of fairly equal likelihood of occurrence. The meteorologist then forecasts the possibility he believes most likely to occur. Such a procedure leads, of course, to errors in prediction, and it is a well-established fact that forecasting is not 100 per cent accurate. However, the continual growth and support of the science of meteorology is testimony to the fact that the meteorologist's predictions are far more accurate over a period of time than the layman's guess, and fortunately this is particularly true of the most dangerous conditions. While meteorology will therefore not eliminate all the hazards or inefficiencies attributable to weather and wave action, it will go a long way towards reducing them.

With the above circumstances in mind, the purpose of this article is to develop an objective procedure through which supervisory personnel can arrive at an evacuation decision permitting the maintenance of safety and efficiency. For purposes of simplicity in outlining this plan, reference to tropical disturbances will be confined to hurricanes, although this plan applies to tropical storms also. This proposed plan eliminates the necessity of complete reliance on meteorological prediction and involves the computation of two time periods available for evacuation based on study of past hurricane movement in the Gulf of Mexico, as well as a forecasted evacuation period.

The first computed evacuation period, the minimum evacuation period, will be determined on the assumption that the hurricane will move from its present position and trajectory directly towards the offshore location with a speed of movement equal to the maximum which has ever been recorded over a period of years in the direction concerned in the Gulf of Mexico. This minimum evacuation period will take into consideration the fact that evacuation cannot be accomplished safely in the large zone of squally weather and 30 to 40 m.p.h. winds which are assumed in the computations to extend a maximum of

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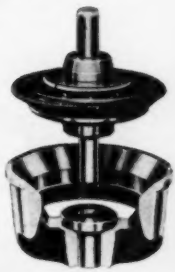

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200 miles from the center of the hurricane, and also that safe evacuation is difficult if hurricane swell 6 ft. in height or greater affects the rig location ahead of the hurricane.

The second evacuation period, the average evacuation period, is based on the assumption that the hurricane will move from its present position and trajectory directly towards the offshore location with a speed which is an average based upon a statistical analysis of hurricane movements in the direction concerned in the Gulf of Mexico over a period of years. As in the preceding computation, the assumption will be made that evacuation can not be completed safely in the zone of squally weather with 30 to 40-m.p.h. winds which are assumed in the computation, to extend as an average 150 miles out from the center of the hurricane or in hurricane generated swell 6 ft. or greater in height.

The third computed evacuation period, the forecasted evacuation period, is based on the meteorological forecast and is determined in the same manner as in the minimum and average periods using the forecasted speed of movement. In many cases, of course, the disturbance will not be forecasted to affect the offshore locations, in which case only the first two evacuation periods are provided.

Example of Determination

An example of the determination of the minimum evacuation period in an actual case is illustrated in Fig. 1 which was worked out for the hurricane that affected the Gulf-Caribbean area from September 18 to 22, 1948. From 12:30 p.m. C.S.T., September 18, to 10:30 a.m. C.S.T., September 19, the hurricane moved northwest, 13 m.p.h. to a point A. When the disturbance reached point A, the following calucuations were made from the Grand Isle, La., area. The maximum northwesterly speed of a hurricane over the Gulf of Mexico was found to be 17.8 m.p.h. from an analysis of past hurricane movement. Consequently, in the calculation of the minimum evacuation period a speed of movement of 18 m.p.h. was used.

At a speed of 18 m.p.h. the center of the hurricane would reach point B 12 hours later and move into the Gulf. Calculations then show that at a speed of 18 m.p.h. the hurricane would move as fast as the swell which it was generating; consequently, the waves would average 3 to 4 ft. at Grand Isle, when the hurricane arrived at point C, and would rapidly increase to 29 ft. 9 hours later. Thus, assuming a maximum velocity of 18 m.p.h. for the hurricane, and a zone of squally weather with 30 to 40-m.p.h. winds extending outward 200 miles from its center, there would still remain 34 hours available for evacuation of personnel from the offshore platforms, the minimum evacuation period.

An example of the determination of the average evacuation period is illustrated in Fig. 2 which shows the movement of the hurricane at an assumed average speed of 11 m.p.h., which is an average northwesterly movement of hurricanes over the Gulf of Mexico, based upon a statistical analysis from 1934 to 1944. The first 5 to 6-ft. swell to reach Grand Isle would be generated when the hurricane arrived at point B_2 and would move to Grand Isle in 27 hours. The time required for the hurricane to move from point A_2 to point B_2 at 11 m.p.h. would be 28 hours. The outer zone of squally hurricane winds assumed to extend 150 miles from the center advancing at 11 m.p.h. from point B_2 would require 33 hours to reach Grand Isle. Thus in this case the arrival of hurricane swell would govern, and the average evacuation period would be 55 hours.

In this case the hurricane was forecasted to move inland between Apalachicola and Tampa, so that a forecasted evaluation period was not provided. Recurvature of the hurricane actually commenced shortly after midnight, September 20, as shown in Figs. 1 and 2.

The computation of the minimum, average, and forecasted evacuation periods can be completed shortly after receipt of a fix on the hurricane center. These fixes are usually available twice daily, depending on radar and aircraft reconnaissance facilities; and a fairly accurate estimate of the position of the center can be made between the time of these fixes. Thus supervisory personnel can be furnished several times daily complete information as to the time available for evacuation under the assumption of most rapid, average, and forecasted hurricane movement. With this information, and complete understanding of the time required to complete evacuation of each platform a decision can be made on the basis of fact rather than guesswork.

Each Location Separate Problem

It is emphasized that each location must be considered a separate sphere of action. One platform will require a certain period of hours to complete the complex procedure of leaving a million-dollar investment to the mercy of battering waves, while another location will require a totally different length of time depending upon the present status of the drilling, and the time required to transport the men to shore while weather conditions are still operational.

The foregoing plan may be modified such that the conditions under which evacuation will be commenced be determined in advance, and the number of hours required for evacuation set in each case depending on the status of operations. With this arrangement the meteorologist can inform the supervisory personnel when the prearranged conditions are fulfilled. In the application of either plan, close cooperation between the meteorologist and the oil-company personnel is essential. A decision to evacuate offshore operations is entirely too complex to be based on a written advisory, prepared by meteorologists unacquainted with offshore problems, and interpreted by oil-company personnel unacquainted with the meteorologist's problems. Instead, the supervisors making the evacuation decision must be in a position to discuss directly with the meteorologists, the meteorological and oceanographic variables involved, and their relation to offshore operations.

Table 1 shows the number of hurricanes and tropical storms entering or forming per year in the Gulf of Mexico over the 10-year period from 1933 to 1943. As an average, one to two hurricanes will affect the Gulf of Mexico, at which time, depending upon the specific location and the direction of movement of the hurricane, drilling must be stopped and evacuation completed.

TABLE 1

Number of hurricanes entering or forming per year in the Gulf of Mexico over a 10-year period:

1933	5
1934	2
1935	2
1936	1
1937	0
1938	2
1939	0
1940	1
1941	2
1942	2
1943	2
Total	19

Number of tropical storms entering or forming per year in the Gulf of Mexico over a 10-year period:

1933	4
1934	2
1935	0
1936	5
1937	3
1938	2
1939	2
1940	1
1941	1
1942	1
1943	0
Total	21

Fig. 3 illustrates the various zones of hurricane formation in the Gulf of Mexico and the likelihood of formation occurring in each zone. Those hurricanes originating in Zone B are the most dangerous from the safety standpoint as adequate warning is rarely received in this area due to the scarcity of observation facilities.

It is possible, however, to provide warning of the development of tropical low pressure areas in Zones A and B in which hurricanes or tropical storms may develop. for example, in the case of the hurricane affecting Grand Isle, La., on September 3-4, 1948, only 16 hours' warning of actual hurricane conditions was possible, but advisories concerning the existence of the tropical low pressure area from which the hurricane devel-

(Continued on page 87)

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EIGHT FACTORY TYPE REPAIR BRANCHES WHERE TRAINED EXPERTS GIVE 24 HOUR SERVICE FOR CUMMINS DIESELS
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200 miles from the center of the hurricane, and also that safe evacuation is difficult if hurricane swell 6 ft. in height or greater affects the rig location ahead of the hurricane.

The second evacuation period, the average evacuation period, is based on the assumption that the hurricane will move from its present position and trajectory directly towards the offshore location with a speed which is an average based upon a statistical analysis of hurricane movements in the direction concerned in the Gulf of Mexico over a period of years. As in the preceding computation, the assumption will be made that evacuation can not be completed safely in the zone of squally weather with 30 to 40-m.p.h. winds which are assumed in the computation, to extend as an average 150 miles out from the center of the hurricane or in hurricane generated swell 6 ft. or greater in height.

The third computed evacuation period, the forecasted evacuation period, is based on the meteorological forecast and is determined in the same manner as in the minimum and average periods using the forecasted speed of movement. In many cases, of course, the disturbance will not be forecasted to affect the offshore locations, in which case only the first two evacuation periods are provided.

Example of Determination

An example of the determination of the minimum evacuation period in an actual case is illustrated in Fig. 1 which was worked out for the hurricane that affected the Gulf-Caribbean area from September 18 to 22, 1948. From 12:30 p.m. C.S.T., September 18, to 10:30 a.m. C.S.T., September 19, the hurricane moved northwest, 13 m.p.h. to a point A. When the disturbance reached point A, the following calucuations were made from the Grand Isle, La., area. The maximum northwesterly speed of a hurricane over the Gulf of Mexico was found to be 17.8 m.p.h. from an analysis of past hurricane movement. Consequently, in the calculation of the minimum evacuation period a speed of movement of 18 m.p.h. was used.

At a speed of 18 m.p.h. the center of the hurricane would reach point B 12 hours later and move into the Gulf. Calculations then show that at a speed of 18 m.p.h. the hurricane would move as fast as the swell which it was generating; consequently, the waves would average 3 to 4 ft. at Grand Isle, when the hurricane arrived at point C, and would rapidly increase to 29 ft. 9 hours later. Thus, assuming a maximum velocity of 18 m.p.h. for the hurricane, and a zone of squally weather with 30 to 40-m.p.h. winds extending outward 200 miles from its center, there would still remain 34 hours available for evacuation of personnel from the offshore platforms, the minimum evacuation period.

An example of the determination of the average evacuation period is illustrated in Fig. 2 which shows the movement of the hurricane at an assumed average speed of 11 m.p.h., which is an average northwesterly movement of hurricanes over the Gulf of Mexico, based upon a statistical analysis from 1934 to 1944. The first 5 to 6-ft. swell to reach Grand Isle would be generated when the hurricane arrived at point B_1 and would move to Grand Isle in 27 hours. The time required for the hurricane to move from point A_2 to point B_2 at 11 m.p.h. would be 28 hours. The outer zone of squally hurricane winds assumed to extend 150 miles from the center advancing at 11 m.p.h. from point B_2 would require 33 hours to reach Grand Isle. Thus in this case the arrival of hurricane swell would govern, and the average evacuation period would be 55 hours.

In this case the hurricane was forecasted to move inland between Apalachicola and Tampa, so that a forecasted evaluation period was not provided. Recurvature of the hurricane actually commenced shortly after midnight, September 20, as shown in Figs. 1 and 2.

The computation of the minimum, average, and forecasted evacuation periods can be completed shortly after receipt of a fix on the hurricane center. These fixes are usually available twice daily, depending on radar and aircraft reconnaissance facilities; and a fairly accurate estimate of the position of the center can be made between the time of these fixes. Thus supervisory personnel can be furnished several times daily complete information as to the time available for evacuation under the assumption of most rapid, average, and forecasted hurricane movement. With this information, and complete understanding of the time required to complete evacuation of each platform a decision can be made on the basis of fact rather than guesswork.

Each Location Separate Problem

It is emphasized that each location must be considered a separate sphere of action. One platform will require a certain period of hours to complete the compiex procedure of leaving a million-dollar investment to the mercy of battering waves, while another location will require a totally different length of time depending upon the present status of the drilling, and the time required to transport the men to shore while weather conditions are still operational.

The foregoing plan may be modified such that the conditions under which evacuation will be commenced be determined in advance, and the number of hours required for evacuation set in each case depending on the status of operations. With this arrangement the meteorologist can inform the supervisory personnel when the prearranged conditions are fulfilled. In the application of either plan, close cooperation between the meteorologist and the oil-company personnel is essential. A decision to evacuate offshore operations is entirely too complex to be based on a written advisory, prepared by meteorologists unacquainted with offshore problems, and interpreted by oil-company personnel unacquainted with the meteorologist's problems. Instead, the supervisors making the evacuation decision must be in a position to discuss directly with the meteorologists, the meteorological and oceanographic variables involved, and their relation to offshore operations.

Table 1 shows the number of hurricanes and tropical storms entering or forming per year in the Gulf of Mexico over the 10-year period from 1933 to 1943. As an average, one to two hurricanes will affect the Gulf of Mexico, at which time, depending upon the specific location and the direction of movement of the hurricane, drilling must be stopped and evacuation completed.

TABLE 1

Number of hurricanes entering or forming per year in the Gulf of Mexico over a 10-year period:

1933	5
1934	2
1935	2
1936	1
1937	0
1938	2
1939	0
1940	1
1941	2
1942	2
1943	2
Total	19

Number of tropical storms entering or forming per year in the Gulf of Mexico over a 10-year period:

1933	4
1934	2
1935	0
1936	5
1937	3
1938	2
1939	2
1940	1
1941	1
1942	1
1943	0
Total	21

Fig. 3 illustrates the various zones of hurricane formation in the Gulf of Mexico and the likelihood of formation occurring in each zone. Those hurricanes originating in Zone B are the most dangerous from the safety standpoint as adequate warning is rarely received in this area due to the scarcity of observation facilities.

It is possible, however, to provide warning of the development of tropical low pressure areas in Zones A and B in which hurricanes or tropical storms may develop. for example, in the case of the hurricane affecting Grand Isle, La., on September 3-4, 1948, only 16 hours' warning of actual hurricane conditions was possible, but advisories concerning the existence of the tropical low pressure area from which the hurricane devel-

(Continued on page 87)

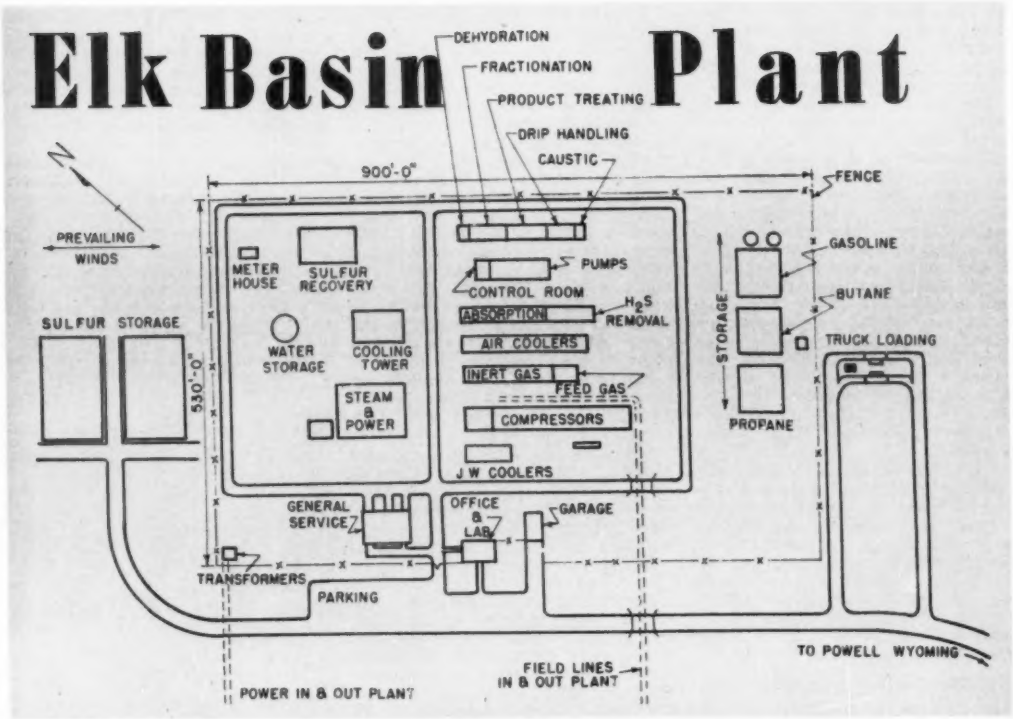

Fig. 1—Plot plan of the Elk Basin plant operated by Stanolind Oil & Gas Co.

. . . PRODUCES INERT GAS FOR INJECTION INTO RESERVOIR . . . EXTRACTS NATURAL GASOLINE, BUTANE, PROPANE, H_2S, CO_2 . . . PRODUCES SULFUR

A Conservation Project

by L. R. Lyon,* R. A. Feagan, Jr.,* and H. B. Manley*

IN recent years the Rocky Mountain area has been the scene of intensive development by the oil industry. In Wyoming, a boom in oil activity occurred during the 6 years from 1942 to 1947, with 41 new fields discovered and 23 new producing horizons developed in old fields. At Elk Basin, oil has been produced for approximately 35 years, but it was not until the latter part of 1942 that oil was discovered in the combined Embar-Tensleep sands. With the increased crude-oil demand of the last war, this reservoir, which lies partly in Montana, became the greatest producer in either of these two states.

*Stanolind Oil & Gas Co., Tulsa.

A study of Elk Basin field indicated that pressure maintenance would materially increase the ultimate production of crude from the Embar-Tensleep reservoir. Subsequently, in May 1946, with the approval of the Secretary of the Interior, the 29 working interests unitized the Embar-Tensleep and all lower potential horizons and made Stanolind Oil & Gas Co. the operator. The unit agreement provided that a development and operating program be established for the more proper conservation of the unitized substances, and a part of this program required the maintenance of reservoir pressure by the injection of natural or inert gas or water.

Detailed engineering study indicated that shrinkage of casing-head gas when processed by sweetening and compression would be so great that the residue gas alone would not provide adequate pressure maintenance. Since neither sufficient water nor outside gas was economically available, the injection of inert combustion gases from a boiler into the reservoir was considered the most favorable means of pressure maintenance. In September 1946 the Embar-Tensleep Operating Committee of the Elk Basin Unit authorized the preparation of engineering plans and specifications for a pressure maintenance plant.

In June 1947 the design was ap-

proved and construction authorized for a plant (1) to produce 14,000,000 standard cubic feet per day of boiler flue gas suitable for injection into the reservoir and (2) to process 12,000,000 standard cubic feet per day of casing-head gas for the production of plant fuel and the recovery of liquid hydrocarbons and sulfur. Construction of the plant was started in September 1947 and initial operations began in March 1949. Stone & Webster Engineering Corp. was contractor for this job.

The Elk Basin plant, in addition to producing inert gas for injection into the reservoir and processing casing-head gas for recovery and utilization of the hydrocarbons, also produces sulfur. In most plants of this nature, hydrogen sulfide extracted during the sweetening operation is flared and vented to the atmosphere — a total loss. In the Elk Basin plant, this corrosive and toxic gas produces commercial sulfur, thereby further contributing to the conservation of Wyoming's natural resources.

A favorable factor in the recovery of sulfur at Elk Basin is the high content of hydrogen sulfide in the casing-head gas. At the time of discovery of the Embar-Tensleep reservoir, this casing-head gas contained the highest concentration of hydrogen sulfide encountered in any known production.

Field System

Elk Basin oil field is located on the Montana-Wyoming border, 18 miles north of Powell, Wyo. The major part of the field is in Park County, Wyoming, with a portion extending into Carbon County, Montana. The field appears to be an anticlinal trap with several producing formations. Prior to the Embar-Tensleep development, light production was realized from the Frontier and Dakota (gas) formations. Recently, completions have been made in the Madison Lime, which is below the Embar-Tensleep and to date the deepest producing formation in the field.

In 1948, Elk Basin field produced about 7,200,000 bbl. of oil, of which about 6,000,000 bbl. was Embar-Tensleep crude.

The Embar-Tensleep now produces from 124 wells ranging in depth from 3,900 to 6,000 ft. Casing-head gas is collected from elevated separators at nine consolidated crude oil tank batteries in the field. The gas-collection system is installed above ground on wooden ties and consists of about 10 miles of pipe ranging from 6 to 22 in. in diameter. The collection system, consisting of two main lines, one from the north part of the field, the other from the south, is sized to deliver gas to the plant compressors at a pressure slightly above atmospheric, with field separators operated at 2 psig. Vacuum operation is avoided, in order to prevent possible air infiltration and

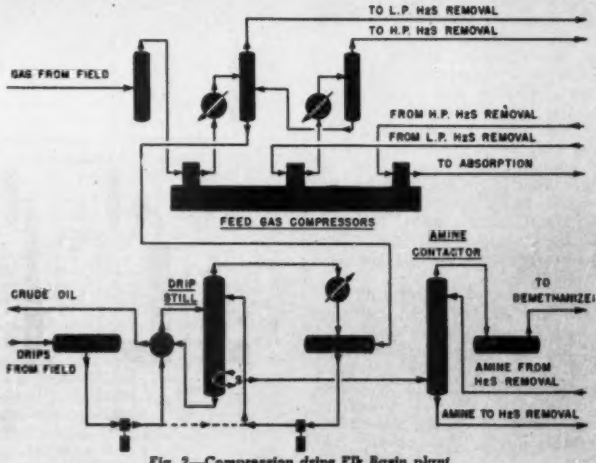

Fig. 2—Compression drips Elk Basin plant

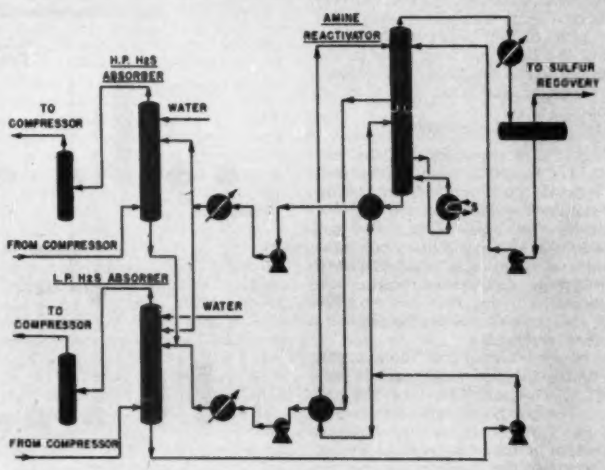

Fig. 3—H_2S removal section of plant

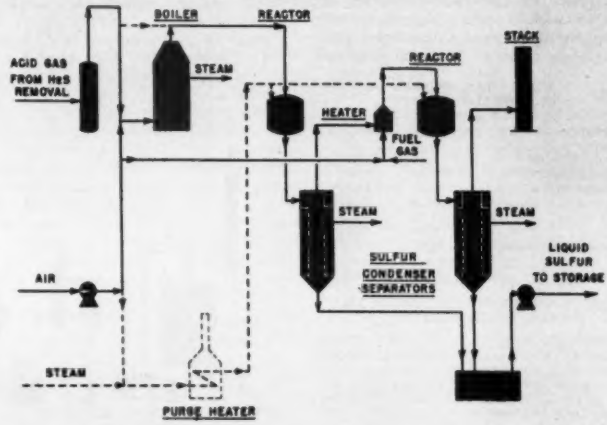

Fig. 4—Sulfur-recovery process

thereby minimize potential corrosion by hydrogen sulfide.

The gas-collection system is designed with a minimum number of low spots as trap and accumulation points for line condensate or drips. These low points are equipped with underground drip-collection tanks from which pumps, controlled by float-operated switches, deliver the condensate to a surge tank at the plant. There are six such collection points from which small pipe lines run to the plant paralleling the gas-collection system.

Package units for dehydrating casing-head gas at the field batteries have been included in the design but as yet have not been installed. It is planned to determine by operating experience whether it will be necessary to dehydrate the gas in order to prevent freeze-up of the gas-collection system during the extreme cold weather.

The field injection system delivers inert gas from a plant pressure of 1,500 psig. to four wells in the south part of the field and four wells in the north part. The lines are underground and range in size from 2 to 6 in. in diameter.

Elk Basin Plant

Plant design provides for the extraction of H_2S, CO_2, gasoline, butane, and most of the propane from 12,000,000 standard cubic feet per day of casing-head gas, producing a fuel gas suitable for plant boilers and compressors, a residue gas in salable form at 500 psig., commercial sulfur and noncorrosive boiler flue gas at 1,500 psig. for injection into the Embar-Tensleep reservoir.

As may be seen from Table 1, the sweetening of the field gas by removal of H_2S and CO_2 leaves a gas rich in propane and heavier hydrocarbons. For recovery of these hydrocarbons, a number of process cycles were studied. The absorption cycle selected consists of a single intercooled high-pressure absorber followed by (1) a reboiled absorber (demethanizer) operating at a lower pressure for partial stabilization of the rich oil, and

TABLE 1—FEED GAS—DESIGN BASIS—ELK BASIN PLANT

Components—	Mol. %	M.S.C.F.D.
Nitrogen	2.00	240
Carbon dioxide	6.00	720
Hydrogen sulfide	18.50	2,220
Methane	41.75	5,010
Ethane	15.50	1,860
Propane	7.41	889
Butanes	5.20	624
Pentanes and heavier	3.64	437
Total	100.00	12,000

TABLE 2—PRODUCTS—DESIGN BASIS—ELK BASIN PLANT

Propane, gal./day	19,100
Butane, gal./day	20,200
Natural gasoline, gal./day	16,900
Sales gas @ 500 psig., S.C.F./day*	4,200,000
Inert gas @ 1,500 psig., S.C.F./day	14,000,000
Sulfur, long tons/day	74

*Includes inert gas dilution to 1,000 B.t.u. per S.C.F. (dry).

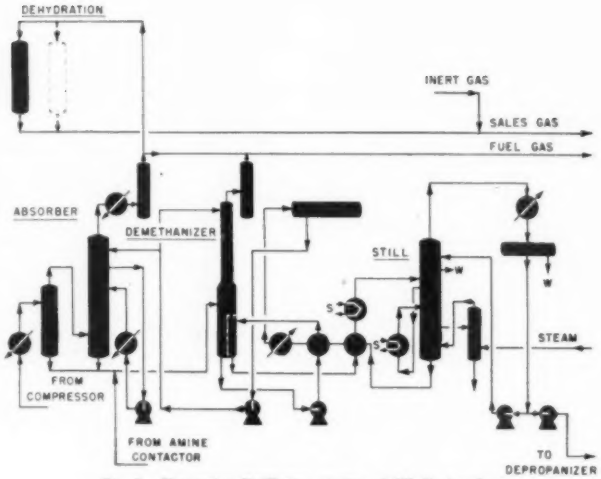

Fig. 5—Absorption-distillation section of Elk Basin plant

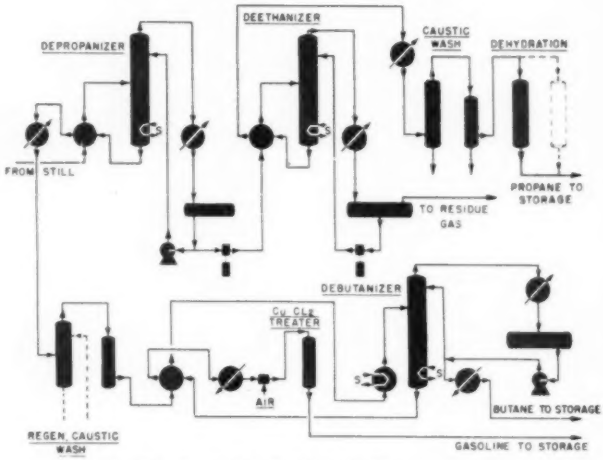

Fig. 6—Fractionation and product treating flow arrangement of plant

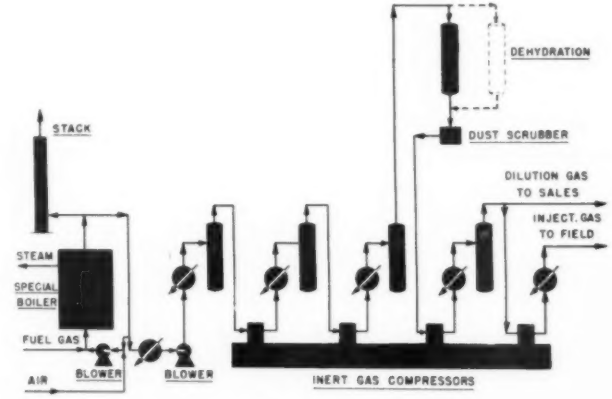

Fig. 7—Inert gas system

(2) a single still for stripping the heavier absorbed hydrocarbons from the absorption oil. A study of plant and fields conditions indicated that the plant should be designed for 80 per cent propane recovery. Design product quantities are tabulated in Table 2.

In conjunction with the preparation of inert gas, a steam power plant is provided to produce steam and electricity for the plant and part of the electric power required by the field; additional electric power required for the field and standby for the plant is purchased from outside sources. Boiler flue gas is dehydrated and compressed to 1,500 psig. for injection.

Water for the plant, available from the system that was installed during the development of the reservoir, is pumped from the Clark's Fork River, which is approximately 15 miles west of the field in the Absaroka foothills. Since plant makeup water is limited by this system to 5,000 bbl. per day and because air temperatures are quite low in this region, a large portion of the cooling is accomplished by air-cooled units. Design of the cooling equipment is based upon an 80°-85° F. dry-bulb temperature and a 60° F. wet-bulb temperature. Plant layout is shown in Fig. 1.

Product shipment from the plant is by truck. Rail facilities are provided at Powell, Wyo., for transshipment of lump sulfur.

Field-gas compressors. — The plant field-gas compressors (Fig. 2) consist of three three-stage 1,000-hp. (sea-level rating), two-cycle, right-angle, gas-engine-driven units designed to compress a total of 12,000,000 standard cubic feet per day from 12.7 to 540 psia. Because of the 4,962 ft. altitude, these compressors are derated to approximately 860 hp. each.

Field gas enters the plant through a scrubber designed to remove entrained crude oil, scale, and other foreign materials. Gas from this scrubber flows to the first-stage suction header at 0.5 psig. and is compressed in the first stage of compression to 46 psig. The first-stage discharge gas is cooled, passed through a separator, and sent to the low-pressure amine absorber where it is partially stripped of hydrogen sulfide and almost completely stripped of carbon dioxide. The gas is then further compressed to 152 psig. in the second stage, cooled, passed through a separator and treated in the high-pressure amine absorber for hydrogen sulfide removal to a maximum residual concentration of 0.25 grains H_2S per 100 standard cubic feet. The sweet gas is then compressed in the third stage to 525 psig., passed through the third-stage aftercooler and charged to the main absorber. One of the inert gas injection compressors is manifolded to serve as a spare for the field gas compressors.

H_2S removal system.—A flow diagram of the H_2S removal system is indicated in Fig. 3. Because of the high acid gas (H_2S and CO_2) content, it was found desirable to use a two-stage amine process for sweetening. This system removes hydrogen sulfide and carbon dioxide from the field gas by contact with a water solution of monoethanolamine in 21-tray contactors or absorbers installed at the discharge of the first (46 psig.) and second (152 psig.) stages of compression.

The first-stage amine absorber reduces the hydrogen sulfide content to approximately 100 grains per 100 standard cubic feet and the second or final cleanup stage produces a gas which will pass the lead acetate test. The rich amine solution with its load of acid gas is pumped through heat exchangers to the reactivator where the H_2S and CO_2 are stripped from the solution by steam vapors generated in the reboilers. The reboilers are heated with extraction steam from the power plant.

For better heat economy, a "split flow" amine system is used. About half of the rich amine enters at the top of the packed reactivator and the remainder enters at the midpoint of the tower. A stream of partially stripped or semilean solution, withdrawn immediately above the middle of the reactivator, exchanges heat with the feed, and is pumped through coolers to the low-pressure absorber, entering the fifteenth tray from the bottom.

The completely stripped or lean solution, from the bottom of the reactivator, exchanges heat with the feed and is pumped through a cooler. From the cooler, this stream splits, half entering the high-pressure absorber on the nineteenth tray and half entering the low-pressure absorber on the eighteenth tray from the bottom. The rich solution from the bottom of the high-pressure absorber, having a relatively low acid gas content, is added with the semilean solution to the low-pressure absorber. A water-wash stream from the discharge of the reactivator reflux pump enters the top (twenty-first) tray of the low-pressure absorber, and a separate water-wash stream, stripped of acid gas, enters the top (twenty-first) tray of the high-pressure absorber, thus minimizing amine loss to the gas streams. Splitting the flow of the rich and lean solution streams in the above manner results in a reduction of reactivation heating and cooling loads.

Overhead vapor from the reactivator is cooled to approximately 115° F.; the condensed water is pumped back to the tower as reflux and the acid gas flows to the sulfur recovery unit. The process design for the H_2S removal system was developed by Girdler Corp.

Sulfur recovery system.—Sulfur has several rather unusual properties which must be kept in mind when considering the design of the sulfur recovery system. At room temperature the stable crystalline form of sulfur is rhombic, at about 200° F. a solid transition to the monoclinic form occurs, and sulfur melts at approximately 240° F. At the melting point, sulfur is a straw-colored liquid of low viscosity, and as the temperature is increased the viscosity decreases slightly up to a temperature of about 320° F. With further heating, the viscosity rapidly increases from about 40 cp. at 320° F. to more than 2,000 cp. in the region of 400° F. and then decreases again as the temperature rises above 400° F. Thus, at 320° F., sulfur is easily handled as a liquid in pumps and plant piping, but at 400° F. it is a heavy plastic material.

Design of the Elk Basin sulfur recovery system is based on a modification of the Claus process. Variations of this process have been used for a number of years in Europe but only recently has it been commercially developed in the United States.

In the Elk Basin plant, acid gas from the amine unit, containing approximately 75 per cent H_2S and 25 per cent CO_2, enters the sulfur-recovery unit through a scrubber which removes entrained water (Fig. 4). Part of the acid gas from the inlet scrubber is burned with controlled air in a specially designed boiler to produce sulfur dioxide, utilizing the heat of combustion to generate 200-psig. saturated steam. The combustion chamber of the boiler is operated at a pressure sufficiently high (about 3 psig.) to force the combustion products through the remainder of the process without blowers or compressors.

Combustion products from the boiler, containing sulfur dioxide, are commingled with the unburned portion of the acid gas and pass to the first reactor, which contains a bauxite catalyst. The design inlet temperature of the reactor is 450° F. Reduction of sulfur dioxide and oxidation of hydrogen sulfide occurs over the catalyst, releasing elemental sulfur. The heat of reaction raises the temperature to approximately 740° F., and at reactor exit conditions the sulfur is in the vapor state.

The reactor effluent gases are cooled to approximately 300° F. in a condenser-separator which condenses the sulfur vapor and generates low-pressure steam at approximately 35 psig. Reaction is not completely effected in one reactor; therefore, the remaining unreacted gases are reheated above the sulfur dew point to a temperature of 450° F. in a gas-fired line heater and pass to a second and final reactor where the reaction proceeds substantially to completion. The exit gas from the second reactor flows to a second condenser-separator where the sulfur vapor is condensed at about 300° F. The noncondensed gas, which should contain less than 1 per cent H_2S, is exhausted to the atmosphere.

(Continued on page 87)

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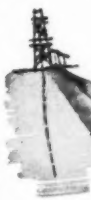

"That's the whole basis of Controlled Vertical Drilling . . . take frequent readings with a reliable recorder; never let hole deflections get beyond the critical angle; use the information the recorder supplies as a guide for correct weight and speed to cut each formation efficiently. That's the way to drill *better* wells, drill 'em faster, drill 'em cheaper."

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Characteristics of Detergent Suspended DRILLING FLUIDS

by Todd M. Doscher*

DRILLING fluid probably exerts more influence upon the productivity of an oil well than any other one factor, as regards drilling and completion practice. However, as important as this question is, there has been little time devoted to determining the mechanism and action of the fluid and its components. It has been common experience to observe that some fluids perform miracles in some applications and fail miserably in others. It would be highly desirable to be able to predict this behavior especially with reference to ultimate permeability of the formation to crude.

As a step in this direction, this report presents the results of a series of investigations made at the University of Southern California on the effect of detergents—both anionic and nonionic—on drilling fluids composed of clays suspended in water and oil.

In the course of an investigation on the effect of soaps and sulfonates on suspensions of bentonite in water, a marked relation was observed to exist between fluid loss and gel strength Typical results are shown in Fig. 1.

*Department of Chemistry, University of Southern California, Los Angeles.

These data were obtained by the addition of sodium oleate to a suspension of bentonitic clay in water. It is apparent that at low concentrations of sodium oleate the fluid loss of the suspension is hardly affected and gel strength is raised considerably. Large quantities of sodium oleate, however, lower both fluid loss and gel strength simultaneously.

At first this might seem surprising since gel-forming bentonitic clays are used in preference to nonswelling clays in water-base drilling fluids to obtain a low fluid loss in addition to other properties. However, if these results are at all indicative it appears that the gel structure of the bentonitic suspension, per se, raises fluid loss. This can be readily accounted for by adopting the hypothesis that bentonite forms a gel in water because of an interlocking of the clay particles or because the particles are located in equilibrium positions of minimum potential energy.

If this is so, then the application of a shearing force by filtration of liquid at the permeable wall of the formation (or at the filter wall of a laboratory press) would not be expected to completely break down this structure and a filter cake filled with comparatively large voids would result. The permeability and hence fluid loss of such a filter cake would be high. This hypothesis can be correlated with the fact that the specific volume of the filter cakes of high-fluid-loss bentonitic suspensions is usually greater than that of low-fluid-loss suspensions.

Antigel Additive

If some agent is added to prevent an interlocking structure from forming in the suspension and to keep the clay particles in suspension, it might be expected that the particles would be deposited at the wall as a closely packed and impermeable filter cake. In order for the clay particles to form such a close packed wall there are additional conditions which must be satisfied other than the mere absence of interlocking particles in the fluid. The size distribution of the particles must permit close packing of the particles, reducing the available path for fluid flow, and the small capillaries must become filled or plugged with some material which further restrains the flow of the fluid part of the drilling mud.

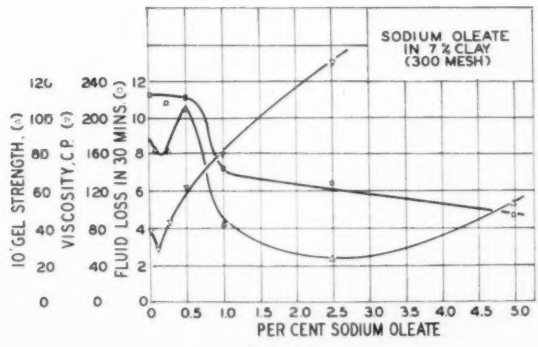


Fig. 1

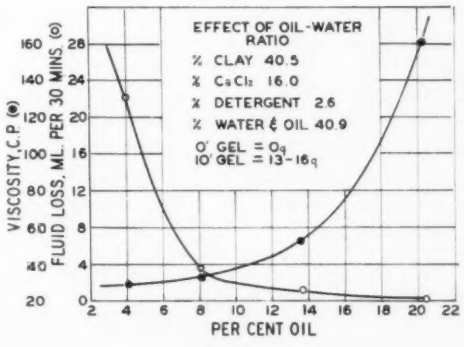


Fig. 2

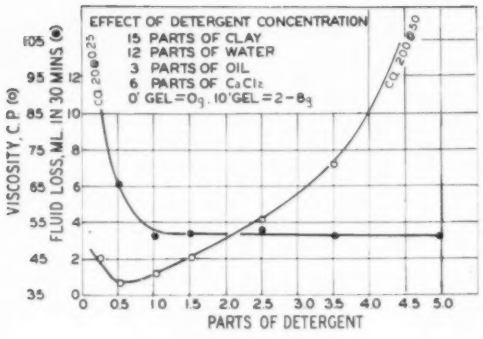

EFFECT OF DETERGENT CONCENTRATION
15 PARTS OF CLAY
12 PARTS OF WATER
3 PARTS OF OIL
6 PARTS OF CaCl2
0' GEL = 0g, 10' GEL = 2-8g
VISCOSITY, C.P. (●)
FLUID LOSS, ML. IN 30 MINS. (○)
PARTS OF DETERGENT

Fig. 3

To verify this hypothesis a suspension of nonswelling clay particles was made by using suspending agents which could also serve to plug up capillary voids in the filter bed. To achieve this purpose the high-gel characteristics of a bentonite-rich native clay was destroyed by the addition of calcium chloride; a nonionic detergent was added as the combination suspending and plugging agent.

It was found that when using Triton X-155* as the suspending agent, about 10 per cent of the latter had to be added to bring the fluid loss down to less than 5 ml. in 30 minutes. This relatively large quantity of detergent produced a fluid of high viscosity and was economically unfeasible.

On the supposition that the role of the detergent was to coat the clay particles it was thought that a crude oil might be used to replace some of the detergent. This was found to be true, and by reducing the concentration of the detergent to 2 to 3 per cent, and adding 5 to 20 per cent of a naphthenic crude oil, lower fluid losses and viscosities were obtained than with high concentrations of detergent alone.

To demonstrate that a bentonitic clay, even though coagulated, was not necessary to achieve these results, a ceramic (kaolin) clay was substituted for the bentonite. Qualitatively equivalent results were obtained with but one important difference. The properties of the fluids prepared from nonswelling ceramic clays, calcium chloride, detergent, oil, and water are summarized in Figs. 2 to 5, and in the following paragraphs.

Effect of the oil.—The effect of oil concentration on a suspension of a 120-mesh ceramic clay is shown in Fig. 2. The oil used was a sample of Santa Fe crude oil. In order to keep several factors constant, the percentages of clay, calcium chloride, detergent, and the total percentage of oil and water, by weight were not varied. It is apparent that the addition of oil decreases water loss and increases viscosity.

It is significant that fluid loss decreases most rapidly before the viscosity rises appreciably. It is therefore safe to conclude that fluid loss is not necessarily a function of the viscosity of the system. Naphthenic-base oils gave somewhat lower fluid losses and viscosities than paraffinic oils. Pure hydrocarbons such as benzene, some of its derivatives, or other crude oils could be substituted for the Santa Fe crude oil.

Effect of the detergent.—The effects produced by varying the concentration of the detergent, shown in Fig. 3, are strikingly similar to the effects observed upon varying the oil concentration. The significant difference, however, is that without any oil present the detergent has some effect even at low concentrations whereas the oil is of absolutely no effect unless some detergent is present. In this set of experiments the independence of decrease of fluid loss upon rise in viscosity is perhaps more striking than in the previous set of experiments. Other nonionic detergents which proved to be satisfactory are Renex† and Tween 80† and Triton X-100.*

These materials are characterized by being relatively soluble in water, good soil detergents, and poor emulsifying agents. Other surface-active materials of the Tween series which are less hydrophilic than Tween 80 do not produce suspensions having the qualities already described. Still other nonionic surface-active materials, such as the polyglycol esters (Glyco Products Co.) and the Spans (Atlas Powder Co.) produce clabbery gels which exhibit a very high fluid loss.

Effect of the suspended solids.—The effect of the clay concentration, Fig. 4, shows quite significantly that the fluid loss of these systems is not merely the result of raising the solids content to a point where it becomes difficult to filter the suspension. Indeed, water loss is practically constant over the range of 10 to 40 per cent clay. However, viscosity and density do increase regularly with increase in clay concentration. It is important to note that fluids which have a comparatively high density (90 to 100 lb. per cu. ft.) can be obtained without the addition of weighting agents, and which have relatively low viscosities and low fluid losses.

The particle size of the ceramic clays used in these suspensions ap-

*Alkyl phenoxy polyethylene oxide ethanols, manufactured by Rohm & Haas Co.

†Renex is an ester of a polyethylene oxide ethanol and fatty and rosin acids. Tween 80 is the polyethylene oxide derivative of sorbitol oleate. Both are manufactured by Atlas Powder Co.

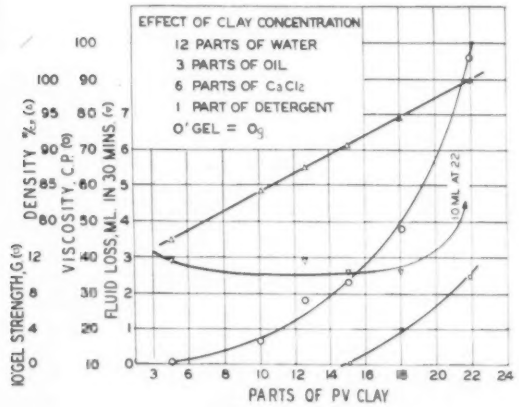

EFFECT OF CLAY CONCENTRATION
12 PARTS OF WATER
3 PARTS OF OIL
6 PARTS OF CaCl2
1 PART OF DETERGENT
0' GEL = 0g
10 GEL, G (●)
DENSITY, % (○)
VISCOSITY, C.P. (●)
FLUID LOSS, ML. IN 30 MINS. (○)
10 ML AT 22
PARTS OF PV CLAY

Fig. 4

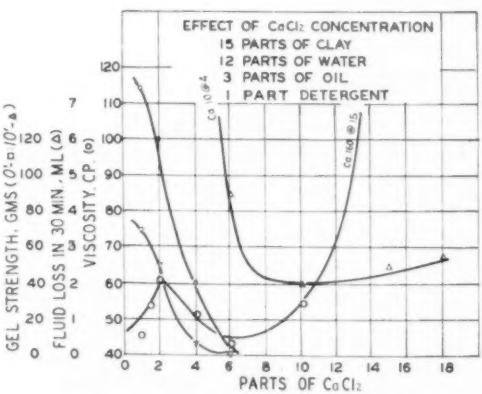
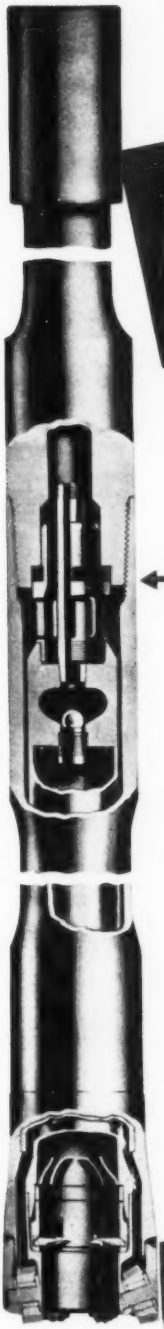

EFFECT OF CaCl2 CONCENTRATION
15 PARTS OF CLAY
12 PARTS OF WATER
3 PARTS OF OIL
1 PART DETERGENT
GEL STRENGTH, GMS (0'-a 10'-▲)
FLUID LOSS IN 30 MIN., ML (△)
VISCOSITY, CP. (●)
PARTS OF CaCl2

Fig. 5



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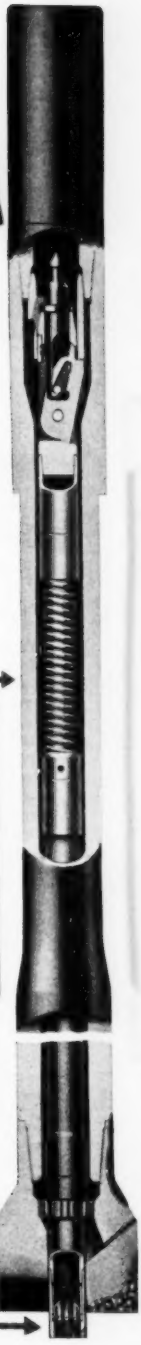

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D+B Challenger Pumps are unsurpassed for economical and efficient field production under a wide range of conditions. The barrel tubes are made of high grade seamless steel tubing, precision honed to a mirror-like finish. The grooved plungers are made of hardened cast iron for maximum strength and durability. High quality materials, improved design and precision workmanship make D+B Challenger Pumps outstanding for low-cost, high-volume production under severe operating conditions.

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This pump is particularly effective in sandy formations. Top hold-down suspension prevents sand from packing between the pump and tubing. The high quality materials and armored fittings provide longer life against abrasive action of sand.

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All Challenger Pumps are equipped with hardened cast iron grooved sectional pin-end plungers. Two to seven plunger sections are assembled on the precision ground plunger tube. They are made of fine grain alloy, centrifugally cast iron and heat treated for maximum life. H-C-I plunger sections are economical to replace after long, severe service.

D+B Barrel Tubes are made of high quality seamless steel tubing honed to a smooth, precision surface. This assures efficient plunger operation. The dimensions of all tubes are carefully controlled to assure complete interchangeability.

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All Challenger Pumps may be equipped with Simplex top or bottom lock or A.P.I. Bottom Lock Hold-downs as optional equipment. Shoe assemblies for use with Simplex locks are interchangeable between top and bottom hold-downs by merely changing lock seat in the shoe.

Superloy Balls and Seats are standard in all Challenger Pump assemblies. They are made of a high grade stainless steel and are carefully tested for efficient valve action. Simplex Balls and Seats, made of same high quality materials are available as optional equipment.

For additional information on D + B Challenger Pumps ask for Bulletin 631-A.

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peared to have a significant effect on the characteristics of the suspensions. Particles below 80 mesh gave larger water losses when suspensions were prepared with them with the same ratio of clay to other components than in those experiments summarized in Fig. 4 with 120-mesh clay. Clays below 200 mesh gave higher viscosities and gel strengths.

Aluminum oxide, silica, and pure aluminum silicate could be substituted for the ceramic clay, but in each case a different range of particle sizes gave optimum results. Bentonite-rich native clays gave even lower fluid losses but viscosities and gel strengths of the suspensions were higher. This is undoubtedly due to the fact that the bentonite clays have ultimately smaller particle sizes than the ceramic clays. Suspensions of sodium bentonites do not require the addition of calcium chloride in order to obtain low fluid losses, but higher gel strengths and viscosities are obtained without the calcium salt. In addition, calcium chloride renders the suspension stable in the presence of sodium chloride.

Effect of calcium chloride and other salts.—The influence of calcium chloride concentration on the properties of the suspension are shown in Fig. 5. It is obvious that with ceramic clay a minimum quantity of calcium chloride must be added to obtain low fluid losses. At very high concentrations the clay and detergent are dehydrated by the calcium chloride and high viscosities and stiff gels are obtained. Magnesium chloride may be used in place of the calcium chloride. Although aluminum chloride produces suspensions having good rheological and fluid loss characteristics, the clay settles out of the suspension relatively rapidly. Sodium chloride will not affect the suspensions significantly unless the calcium chloride-to-clay ratio is small.

Effect of the pH.—The pH of calcium chloride suspensions is between 5 and 7. It can be altered without changing the total amount of calcium present by substituting calcium oxide for some of the calcium chloride. If sufficient calcium oxide is added to secure a pH between 10.0 and 10.8 the fluid loss of a suspension which contains 2.3 per cent of the detergent and 7 per cent of crude oil is lowered from 3.3 ml. to less than 1.0 ml. in 30 minutes. The viscosity is not appreciably affected by this addition of lime but the gel strength is raised slightly. At still higher pH's the suspension is gradually coagulated.

Stability to sodium salts.—The resistance of these suspensions to coagulation by sodium chloride is directly proportional to the ratio of calcium chloride to clay in the original suspension. Neither the oil nor the detergent concentration appear to affect the resistance to sodium chloride. The following table illustrates the injurious effect of sodium chloride as the ration of calcium chloride to clay is decreased.

Filter - cake characteristics. — The filter cakes obtained from fluid-loss measurements were, as might be expected, quite small since little fluid was expressed and little or no settling occurred. Over prolonged filtration runs filter cakes measuring $\frac{1}{16}$ in. or more could be obtained. Although no permeability tests were made on these cakes, tests were made on the ease of breaking down or resuspending the cakes in water or aqueous solutions of various salts. If the cakes were immersed in pure water, little breakdown of the cake occurred. However, in solutions of sodium chloride, the cakes were readily disintegrated with a minimum of mechanical agitation.

It should be noted that filtrates of these suspensions are rich in calcium chloride, which, by preventing gelation in oil sands, would not decrease permeability of the formation to crude oil.

Suspension of 12 parts of water, 6 parts of calcium chloride, 3 parts of oil, 1 part of detergent

Parts of sodium chloride per part of suspension	5 parts of clay		18 parts of clay	
	Viscosity (cp.)	Fluid loss (ml./30 min.)	Viscosity (cp.)	Fliud loss (ml./30 min.)
No salt	11	2.7	44	2.5
1 : 20	15	2.5	48	2.3
1 : 10	17	2.6	55	2.0
1 : 5	16	2.6	103	5.8

Interpretation of Behavior

The commercial usefulness of the fluids described has yet to be proven. Their behavior can be correlated with the action of other drilling fluids in present use and in this way some understanding of the action of various components and ideas for further developments may be obtained.

Where the detergent is added to suspensions of sodium bentonite in water the mode of action of the detergent is probably comparable to that of starch or sodium carboxymethylcellulose. The additives become attached to and part of the swollen clay aggregates and, upon filtration, the voids between the clay aggregates become plugged or pasted with compressed films of these added hydrophilic colloids. The added colloids, in coating or forming common aggregates with the clay particles, also act as protective agents and diminsh the sensitivity to coagulation by salt, cement, gypsum, etc. The viscosity of such fluids is unavoidably raised by the addition of the colloid.

A further complication of the manner in which the soaps and detergents act may be caused by introducing oil into the suspension to form so-called emulsion fluids. Whether a real emulsion is always formed under these circumstances is a moot point since an improvement in viscosity and fluid loss may be obtained by the addition of a minimum amount of oil—a quantity less than the maximum which can be reversibly taken into solution by the soap or detergent. In practice more than this minimum quantity of oil is added and as a result a real emulsion having a relatively high viscosity is obtained (see Fig. 2).

A large amount of oil in emulsion fluids will also introduce another poor operating characteristic. The action of the oil at low concentrations is probably because it enhances the formation of aggregates or micelles of the soaps and detergents, and these aggregates, then, can more effectively coat the clay particles per unit of soap or detergent added. The spaces between the clay particles in the filter cakes become filled with soap-oil micelles and render the capillaries impermeable to further fluid flow. This is substantiated by the fact that at low oil concentrations the filtrates from these suspensions are water white. It is not until 10 per cent or more of oil is added that the filtrates begin to show a coloration due to the presence of oil. The advantage of adding oil and detergent rather than the detergent alone is that lower viscosities may be obtained for the same fluid loss.

The disadvantage of emulsion fluids is two-fold: if anionic soaps are used, they are coagulated by metallic ions just as the clays, and if nonionic detergents are used they are not sufficiently good protective agents under these circumstances to offer the clay any significant protection against salt coagulation. The second disadvantage is that dry clays or weighting agents added to the emulsion fluids may preferentially be wetted by the oil and settle out of suspension.

Another approach to the formulation of drilling fluids has been the use of lime or calcium chloride together with starch or tannins, or the use of calcium chloride and nonionic detergents. The calcium serves a two-fold purpose. First, the addition of calcium serves to dehydrate the clay, and, second, the calcium is physically adsorbed on the clay surface. In those fluids where a high pH is secured by the addition of lime it is likely that the clay particles become coated with calcium hydroxide. This is likely to happen since the calcium concentration and pH are such that the solubility product of calcium hydroxide is usually exceeded.

The highly hydroxylated starch or tannin molecules, in turn, are held by the adsorbed calcium or calcium hydroxide through secondary valence forces such as hydrogen bonding. This chain of events results in the formation of neutral or positively charged, starch or tannin-coated clay particles

as distinguished from the highly hydrated negative colloidal aggregates in suspensions of sodium clays. Although calcium complexes of starch or tannin have not yet been isolated, there is reason to believe they do exist. Calcium complexes of many of the nonionic detergents used in this study have been isolated and are being studied further.

Direct Absorption Probable

There is also the noteworthy example of a calcium compound of a lignin sulfonic acid which is added directly to clay suspensions, viz., Kembrek (Marathon Paper Co.). In this case the protective action is not dependent upon the formation of a calcium complex with the added colloid; instead, direct adsorption of the calcium compound probably occurs. Whether the oil which is added to the calcium-clay-detergent suspensions acts simply by participating in the formation of the protective film around the clay particles or by preferentially wetting the capillary voids remains to be proved. It is likely that only the former process is important at low oil concentrations.

The resistance of the calcium-clay-detergent suspensions to flocculation by sodium chloride is related to the tenacity with which the calcium complex adheres to the clay surface. This is influenced, according to tests by the total calcium concentration in the suspension and inversely by the concentrations of the sodium salt and the clay. This is evidence that some kind of ion exchange between the sodium and calcium ions on the clay surface is involved. It has also been observed that whereas calcium salts will not remove these detergents from aqueous solutions, sodium salts will.

Coat Clay Particles

Another observation further substantiates the hypothesis that detergents and other colloids act by coating the clay particles or aggregates. If the detergent and oil are added to a concentrated suspension of clay in water before adding the calcium chloride, the viscosity of the resulting suspension is higher immediately after the addition of calcium chloride than it would be if the calcium chloride were added first. Prolonged agitation will reduce the viscosity of the former suspension to a value approaching that of the latter.

This irreversibility is due to the fact that when the oil and detergent are added to clay, the latter becomes wetted by the oil phase which then prevents the calcium, later dissolved in the aqueous phase, from penetrating to the clay surface. This same phenomenon is also responsible for the breaking of oil-rich emulsion fluids in the field when dry barytes or clay is added to the fluid in order to raise the density. The added minerals are preferentially wetted by the oil phase and settle out of suspensions before they can become wetted adequately by the aqueous phase. Such difficulties usually can be avoided by wetting the minerals with water or dilute solutions of electrolytes before adding them to the emulsion drilling fluid. Cuttings from the formation will usually not cause any difficulty because they become wetted by the aqueous filtrates from the drilling fluids before they are cut up by the drill.

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BOOKS

AN EVALUATION OF SUNNILAND CRUDE PETROLEUM. By H. E. Schweyer and C. H. Edwards. Published by Florida Engineering and Industrial Experiment Station, Gainesville. 43 pp.

This paper presents a preliminary report on the investigation of the crude petroleum being produced in Sunniland field in Collier County. The crude oil was analyzed on a small scale by the U. S. Bureau of Mines method from which it was determined that it was a high-sulfur, highly asphaltic crude oil containing wax. It was classified as an "intermediate" base oil and may be considered similar to many California crude oils. It was concluded that Sunniland crude oil is a suitable source of gasoline, fuel oils, and asphaltic materials.

QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

References to Costs

We have noted your excellent cost-imating articles and would like to investigate the estimating of costs more completely. Can you direct us to other articles on the subject?—F.M.D.

Little has been published on the subject of unit or itemized costs and this is the reason that The Oil and Gas Journal felt that it was making a contribution to the literature in its Cost-imating series even though such information is always open to question.

The references that are readily available are being mentioned in each of the Cost-imating articles as they appear. In addition, manufacturer's bulletins should be consulted whenever possible. Finally, many of the costs have been developed during the years (1926 to date) by the author in connection with consulting work, and particularly during a period when he directed the cost-estimating department of a construction company.

The few references that comprehensively discuss the estimating of costs are numbers 1-5 in the following list. Other less useful articles, often because they deal with only one type of equipment or perhaps only make indirect references to costs, are at the end of the list. References 6 through 12 are related to indexes of the rate at which costs have been changing during the years. It will be noted that Chemical Engineering has published much material on costs.

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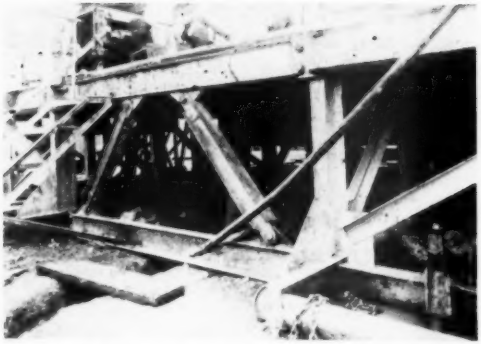
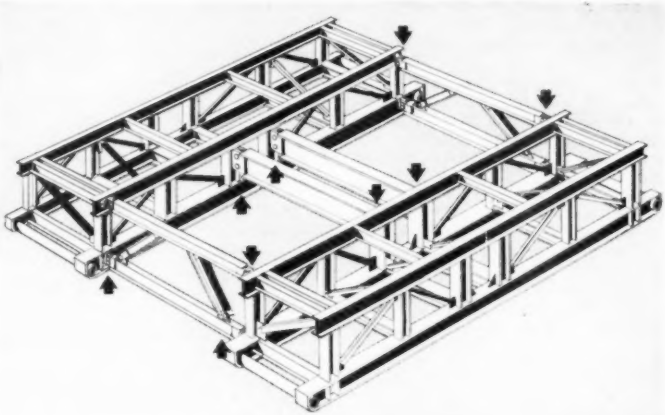


End view of the unitized substructure at a drilling well south of Gainesville. Only 12 drive pins are required to hold the connecting members in place at each end

Above: Unloading substructure sections at Roy Guffey Drilling Co.'s yard near Gainesville, Tex. Note the flooring for the connecting span piled on top and inside the skid. Right: Drawing of unitized substructure. Arrows point to location of drive pins, of which only 32 are required to connect the two skids. A large bearing surface is provided at each corner of the substructure by welding plates 8.5 ft. long on the bottom at both ends of each skid



by D. H. Stormont
District Editor

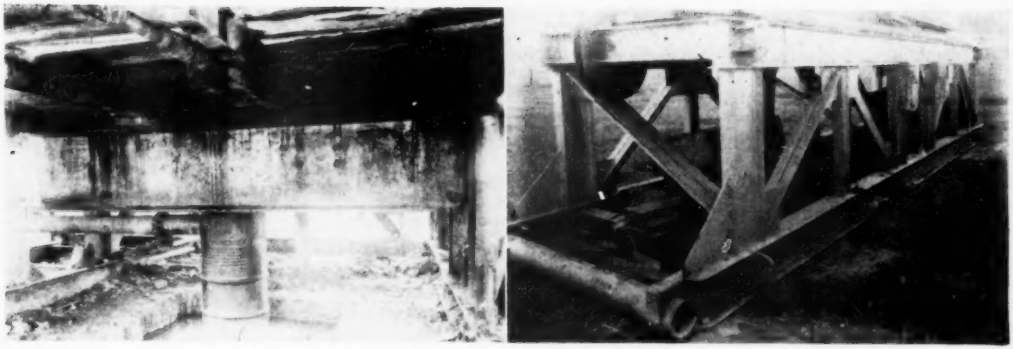
A permanent dead-line anchor is incorporated into the walkway section of the substructure. In rear of the anchor is a stack of leveling plates for inserting under the derrick leg whenever the corner is too low

Steel Bearing Plates Replace Wooden Sills at Unitized Derrick Substructure

WOODEN sills, matting, and blocking are entirely eliminated at the derrick substructure used by one drilling contractor in North Texas. In place of these usual supporting and leveling members, the unitized steel substructure has integral 8.5 by 7-ft. steel bearing plates at each corner. Thus the entire load on the substructure, whether it is on the derrick, the rotary table, or the pipe rack, is carried at the four corners—as far as possible away from the cellar and hole.

The above is the most outstanding feature of the substructures being used by Roy Guffey Drilling Co. at six of its rigs in North Texas and southern Oklahoma, but several others of lesser importance also are incorporated. Among these are the ease and rapidity with which it can be assembled and dismantled. Only 32 drive pins need be driven in place or withdrawn each time the unit is moved on or off a location. Exclusive of actual moving time, the substructure can thus be knocked down and reassembled at a new location in about 2 hours.

Because of the large bearing surface provided at each corner of the substructure no difficulty has been encountered through settling. And a considerable number of wells have been drilled to date in all kinds of weather and on various types of soil. Also, because of the large open area provided around the cellar, it has been easy to keep the cellar clean and free of oil. This ease of cleaning, coupled with the complete absence of wood sills and matting, greatly reduce the fire hazard if any oil



Left: Braces for supporting the rotary table are connected to the two substructure sections by four drive pins. Only one of the two rotary-table beams can be seen. Right: The compartment at each end of the substructure section is used for holding the drive pins, connecting braces, and miscellaneous small equipment whenever the unit is moved

accumulates from taking a drill-stem test.

Two 29 by 7-ft. all-welded skids, 6 ft. high, form the basic parts of the substructure. One of these is placed on the draw-works side and the other on the ramp or pipe-rack side. These are then connected together at the ends, top and bottom, with six horizontal members and four diagonal members. A total of twelve $1\frac{1}{2}$-in. drive pins are used at each end in making these connections, as is shown in one of the accompanying photographs. Two additional 24-in. beams, for supporting the rotary table, are then connected to the skids near the center of the sections. These are placed 2 ft. from the center line, each being held in place by four 2-in. pins.

Substructure Dimensions

Dimensions of the completed substructure are 29 by $25\frac{1}{4}$ ft., or a size designed to handle a 24-ft.-base standard A.P.I. derrick. Weight of the unit is 29,930 lb. without flooring. It has a rated capacity of 300,000 lb., and is built to withstand loads of 537,000 lb. at the corners. The substructure, therefore, is adequate for drilling depths to about 9,000 ft. and can be used with 94, 122, and 129-ft. derricks.

Base of the skids and the bottom connecting members are 6-in. by 1-ft. I-beams, while the upper members are 10-in. I-beams. Uprights are either 6 or 10-in. beams. Cross braces in the skids are of angle iron, while those in the connecting span are 6-in. I-beams. The rotary table braces are 9-in. by 2-ft. beams. These are mounted so that their tops are 10 in. below the floor level, making it possible to have the top of the rotary-table skid flush with the remainder of the derrick floor.

On the bottom at both ends of the two skids a section of steel plate is welded to the bottom flanges of the beams. Each plate is 8.5 ft. in length so that a flush bearing surface of 60 sq. ft. is provided at each of the four corners. Other information relative to the construction of the substructures can be gained from studying the accompanying diagram and photographs.

To support the derrick flooring light steel beams have been welded into the substructure framework. The flooring in both skids is left in place at all times while that used over the connecting span is taken up for each move. During these moves this flooring is piled on or inside the two skids, along with the steel members used to form the connecting span.

Prior to moving the substructure onto a new location, a bulldozer usually is used to level the derrick site. The two skids are then brought in, one to a truck, and placed in position by a gin-pole-equipped truck. The connecting members then are placed between the two sections and the pins driven in place with sledge hammers. Leveling and shim plates are placed under the derrick legs on the low corners or corner whenever the drill site is not exactly level.

The substructure was designed by Roy Guffey, coowner of the firm bearing his name, with offices in Dallas, and Lee C. Moore Corp., Tulsa. The six units now in use in North Texas and Oklahoma were fabricated by Lee C. Moore Corp.

Portable Mats for Drilling Rigs

THESE reusable portable wooden mats substitute for costly concrete pad areas at a General Petroleum Corp. well site, Wilmington, Calif. Just enough concrete has been laid to hold the pumping equipment that will be installed upon completion of the well. The wooden mats provide the rest of the pad necessary to hold a portable drilling rig.

The mats are made of two layers of 3 by 12's, making them 6 in. deep. Over-all size is about 6 by 12 ft. U-bolts are set in each mat for quick handling by the lifting crane, thus improving portability.

Cold Rubber

(Continued from page 62)

cent—the stopping point which had been found to improve the quality. In several days of intensive work an entirely new and adequate shortstop was developed.

Another difficulty was a tendency for the rubber to precoagulate in the reactors and pumps and lines. This, at one time, became so aggravated that entire reactor charges coagulated into a blubber-like mass of rubber. It took 5 days to correct the trouble. The cause was traced to contamination of the reacting rubber from small mosquito-like insects. These probably were attracted by lights over open makeup tanks, fell into the tanks, and thus got into the reactors.

Oxygen contamination also caused trouble. Inasmuch as 0.1 per cent in the vapors over the reacting batches was sufficient to lengthen the reaction time a great deal, the most extreme measures were taken to prevent oxygen contamination, such as special pumps, care in preparation of reacting reagents, care that air was not admitted with the water, and care in the recovery vacuum system that air was not sucked in to contaminate the butadiene and be returned to the process. With all these precautions it was still necessary to inaugurate a practice of aspirating all reactor batches to eliminate oxygen.

Control methods had to be changed to fit cold-rubber production, in which polymerization is 24 times as active as with GR-S. Incident with a lower conversion and cooler latex, very poor separation of butadiene and styrene in the recovery system was experienced, at first. This was corrected by the installation of reflux condensers. A cold latex, in addition to poor separation of butadiene and styrene, also promoted excessive foaming in the columns and required the use of a very powerful antifoam and the development of a continuous means of adding it to the system.

In all, it took nearly a year before it was possible to operate with assurance; to heat up the latex without causing precoagulation; and to control quality to the same narrow variations as has been true of regular GR-S.

Development of Cold Rubber

Commercial production of cold rubber, which began at Baton Rouge in February 1948, is a recent development. Much of the science and technology which were required in this endeavor is also of recent origin. The feeling that low-temperature polymerizations would lead to improved synthetic rubbers is, however, quite old although until recently most authorities were suggesting that the ideal polymerization temperature would probably be the tropical temperature at which natural rubber is formed.

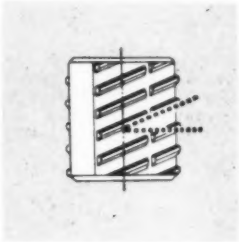
As far back as World War I the Germans were aware that the old methyl rubber was better when manufactured at room temperature than it was when made at an elevated temperature. The only catch was that it took several months to make methyl rubber at room temperature. In fact, when World War II caught America so dangerously short of rubber, there was still no method known for manufacturing diene-type synthetic rubber in a feasible time at temperatures below 100° F. Under the stress of the emergency a reaction temperature of 122° F. was chosen for GR-S largely because that temperature was required to give the 15 to 18-hour reaction for which the government plants then under construction were designed.

At the instigation of the Office of Rubber Reserve, some plant-scale quantities of GR-S were produced at 104° and at 86° F. in the government-owned plant at Los Angeles in November 1943. Laboratory and factory studies of these polymers during 1944 and 1945 did not indicate any outstanding improvement and tire tests showed no superiority over GR-S. Following this program, it was felt by many that polymerization temperature was of minor importance. However, work by Phillips Petroleum Co. on low-temperature polymerizations and on a new type of reinforcing furnace black was progressing rapidly and in April 1947 a public announcement was made that a new synthetic rubber had been developed which "appeared to be equivalent to natural rubber in certain important properties." This was the first public announcement of cold rubber, as we now know it.

One of the factors responsible for the final rapid development of cold rubber was the development of the MDN-ferricyanide polymerization system. MDN, a "speedup" chemical from a class known as diazo thio ethers, was introduced into polymerization work at University of Cincinnati. Chemists at University of Minnesota discovered that this new chemical, when combined with ferricyanide, gave unusually fast polymerizations even at low temperatures. Both the Cincinnati and Minnesota work was sponsored by the Office of Rubber Reserve. The government laboratories operated for Rubber Reserve by University of Akron carried the MDN-ferricyanide recipe to small pilot-plant scale and reported excellent properties for the rubber so prepared. Chemists at Phillips also studied the MDN-ferricyanide system and modified the Minnesota recipe to make it suitable for large-scale production. Rubber so produced by Phillips figured prominently in the first major tire-test program that firmly estab-

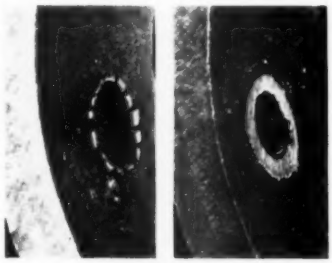
SECURITY CASING SCRAPER MAY BE RUN THREE WAYS

Casing is scraped clean when the Security Casing Scraper is run on either (1) wire line, (2) tubing, or (3) drill pipe. This is possible because it is the only scraper whose cutter teeth contact 360° of the casing circumference at all times. Multiple teeth positively clean every inch of casing with rotary or vertical movement. For example, on the 7" Security Casing Scraper, there are 24 individual shearing teeth which form a total of 98 linear inches of cutting surface. The teeth act upon an obstruction approximately 800 times under average operating conditions.



Reversible Cutter

Tool design and construction is simple and maintenance is easy. Each cutter is held against the casing by three strong coil springs, which exert an even pressure between cutter and mandrel.
The helical teeth on the four opposed, spring loaded cutters produce shearing action which cleans casing quickly, cutting away all burrs or foreign material. Reversible cutters give extra service life.



Perforation Burrs Removed Cleanly

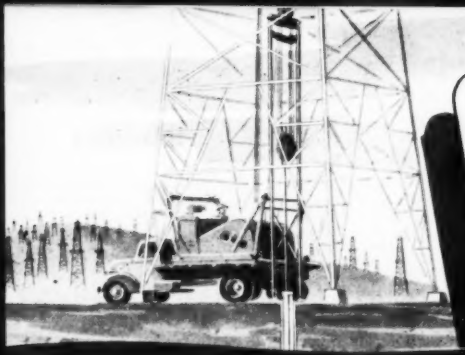
Unretouched photograph of gun perforation before and after removing burrs with Security Casing Scraper. Photo on right shows burr is actually cut (sheared) away, not crushed or broken. For economical scraping, specify Security.

SECURITY ENGINEERING CO., INC.

ONE OF THE DRESSER INDUSTRIES

Main Office: Whittier, Calif.

Branches in all of the major producing areas
Export Office: Chanin Building, New York City

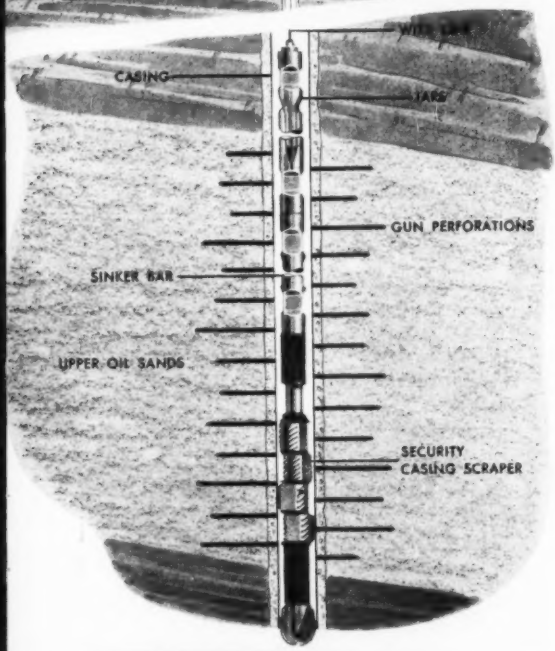


LOCATION: *Signal Hill*

WELL HISTORY: *Depleted production required recompletion at upper pay zone. Gun perforated at 10,000 feet opposite new pay.*

PROBLEM: *Economically scrape casing perforations without rotary equipment.*

How would you Scrape Casing Without a Rotary?



The production superintendent of a large oil company was faced with the problem of scraping 7" casing which had been gun perforated with 150 holes at a depth of 10,000 feet. The only work-over equipment on the job was a small pulling unit backed up to the standard derrick.

The only way he could solve the problem, without moving in rotary equipment, was to run a Security Casing Scraper on wire line. He ran a 7" Security Scraper on ⅝" wire line with a sinker bar above the Scraper and a set of jars above the sinker bar. The scraper was run up and down through the gun perforated section. Only three hours were consumed in this operation, including running in and out of the hole. Packers were run through the scraped section and set without difficulty.

This is a typical example of how the Security Casing Scraper can reduce your work-over costs because it is the only Scraper which does a complete job when run on drill pipe, tubing or wire line. Call your Security Field Representative when you are ready for your next scraping job.

Security

ROCK BITS • CORING BITS • HOLE OPENERS • REAMERS • CASING SCRAPERS • SECURALOY

SECURITY ENGINEERING CO., INC.

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Main Office and Plant: Whittier, Calif. Branches in all of the major producing areas.

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LEE C. Moore

HOW'S THIS FOR SPEED?

The Lee C. Moore patented Jackknife Cantilever Rotary Drilling Mast is designed for speed in transporting and erecting. Once on location all assembling and stringing up is done on the ground. Thus, costly hours are saved from the time the mast arrives until it is ready to start making hole.

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lished the merits of processable cold rubber.

The information from Germany at the close of the war relating to redox polymerization systems and to the Germans' firm belief in the superiority of rubber produced at low temperatures further stimulated interest in this country in polymerizations at lower temperatures. The Germans apparently had studied polymerizations at low temperatures only on a laboratory scale, and above the freezing point of water, and had made no tire tests of redox rubber. They apparently had developed no suitable method for making processable cold rubber and, instead, had concentrated upon preparing tough, unmodified rubber which required a special heat softening before it could be processed. For a time various American groups were greatly interested in redox polymerization, but unfortunately most of their work followed the German practice of using unmodified benzoyl peroxide redox recipes to produce tough, unprocessable rubber. Heat softening largely destroyed the superiority inherent to cold rubber and interest in low temperature polymerizations lagged.

Stewart, Fryling, and others developed redox polymerization recipes in 1941 and 1942 similar to those simultaneously being studied in Germany. These workers apparently were interested in polymerizations in the range of 86° to 95° F. since no examples are given in their patents wherein lower temperatures are used. Since the superiority of cold rubber becomes pronounced only at much lower polymerization temperatures, this early work should be considered significant chiefly in connection with the historical development of the redox method of polymerization.

Recipe in most general use at present is a redox type utilizing cumene hydroperoxide (CHP) as the oxidant. Cumene hydroperoxide was suggested by Hercules Powder Co. as an activator for rosin soap emulsion polymerization in persulfate catalyzed recipes. The University of Minnesota Rubber Reserve group first used cumene hydroperoxide in a redox system. The CHP-redox system was first applied by Phillips to cold-rubber production and the Minnesota recipe was improved greatly in its adaptation to use at low temperature. Later, Phillips proposed a "custom" recipe which was an improved 41° F. redox system and which is currently the recipe now in greatest commercial use. The new chemical, Diox, introduced this year by Phillips, will in all probability replace cumene hydroperoxide in future cold rubber production.

The real "punch" that put cold rubber across commercially in such a short time was supplied by a happy combination of circumstances. In 1942 when the Phillips synthetic-rubber pilot plant was designed, it was planned that the new pilot plant should be capable of producing emulsion synthetic rubber at temperatures as low as 0° F. This completely refrigerated pilot plant was placed in production in 1944 and until 1947 it was the only pilot plant in the world capable of producing cold rubber in large quantities.

Quick to realize the significance of excellent tire tests made of the readily processable cold rubber, Copolymer Corp. immediately requested and obtained approval from the Government to convert one-half of the Baton Rouge plant capacity to the production of 41° F. rubber. Commercial production began on February 20, 1948.

As to future developments, Dr. W. B. Reynolds, supervisor of synthetic rubber development, Phillips Petroleum Co., has this to say: "While the full-scale commercial production of 41° F. cold rubber is a milestone of the greatest significance to the American rubber industry, scientists and rubber technologists by no means consider this the completion of their tasks. Already even more exciting products and processes are clamoring for recognition. In particular, new synthetic rubbers produced at still lower temperatures possess properties suggesting commercial utility. Such antifreeze polymers have shown almost unbelievable wearing qualities in tire treads and their properties strongly suggest wide-scale future use in tire carcasses."

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Hurricanes

(Continued from page 69)

oped were issued commencing on August 31. In the case of hurricanes or tropical storms originating in Zone B, it will be necessary to evacuate during the formative stage of the hurricane or storm for complete safety, or to have an evacuation plan developed which can be rapidly executed immediately after receipt of a hurricane advisory.

It is believed that the recent installation of high-power weather radar along the Gulf Coast will result in greatly improved information concerning tropical disturbance development and movement in Zones A and B. Quite fortunately, hurricanes which originate in Zone A and B are not the most intense, as their trajectory over a water surface, from which the moisture necessary for their continued development must originate, is usually limited. With proximity to a land surface, frictional forces increase and inflow of dry air into the center of the hurricane occurs with its consequent dissipation.

Those hurricanes with the greatest intensity form over the warm waters of the Atlantic Ocean or Caribbean Sea and then proceed on a westerly trajectory over a warm-water surface with resulting increase in magnitude and intensity. Finally, changes in the direction of the wind flow aloft, usually between 4 and 6 miles in the upper atmosphere, cause the ponderous hurricane vortex to shift and proceed into the Gulf of Mexico and thence into the coastal states with its resulting self-destruction. The havoc and waste each year from these storms are estimated in millions of dollars and formerly, before the development of rapid communications and the founding of the Hurricane Warning Service, the loss of hundreds of lives. It is interesting to note that 80 per cent of the hurricanes reaching states bordering the Gulf of Mexico are of this type.

As complex as the outlined procedures of evacuation seem to an observer unacquainted with the destructive forces inherent in a well developed tropical storm or hurricane, they still must become an accepted feature of the offshore work. As a result of past marine tragedies occurring over a period of many years, governmental regulations, design techniques, and operating procedures have been developed in the marine industries to insure a high degree of safety. Many of these regulations and procedures are of borderline applicability in the offshore work on a year round basis. However, if a liberal interpretation of the regulations or outright waiver is proposed by the oil operators, it is essential that the hazards which were originally responsible for the adoption of these regulations be eliminated.

Acknowledgments

The author wishes to express his appreciation for the assistance and encouragement which A. H. Glenn has extended in the preparation of this paper.

Elk Basin Plant

(Continued from page 73)

The condensed liquid sulfur flows from the conical bottoms of both condenser-separators to a surge tank and is pumped to storage through a steam-jacketed line. A small auxiliary heater is provided to burn any potential accumulation of carbonaceous materials from the catalyst beds. This unit also serves as a startup heater.

The important combustion reaction is:

$$H_2S + 3\,2\,O_2 = H_2O + SO_2$$

The reaction over the catalyst is:

$$2H_2S + SO_2 = 2H_2O + 3S$$

The reactors are Lumnite-lined cylindrical vessels, about 16 ft. in diameter, with 6-ft. catalyst beds. Gas flow is downward through the 4-8 mesh bauxite catalyst, with a design space velocity of roughly 250 standard cubic feet per cubic foot of catalyst per hour. The catalyst bed is supported by a stainless-steel grating and wire mesh. To minimize corrosion, an alloy of 18-8 stainless steel is used in the effluent piping from the reactors and for lining the inlet channels of the condenser-separators.

Absorption and distillation system. The gas from the third stage of the field-gas compressors enters the main absorber (Fig. 5) where approximately 90 per cent of the propane and substantially all heavier hydrocarbon components are extracted by the absorption oil at a pressure of 520 psig. The design oil rate to the absorber is 98 g.p.m. One intercooler is used to limit the over-all temperature rise of the oil to 20° F., thus reducing the required oil-circulation rate.

Rich oil from the absorber, together with treated compressor condensate and drip gasoline, enters the fourteenth tray of the demethanizer, which is operated at a pressure of 163 psig. Part of the lighter absorbed hydrocarbons flash and rise through the tower, while the remaining rich oil flows down through the 14-tray stripping section of the tower to the reboiler. In the stripping section, vapors from the reboiler remove methane and some ethane from the rich oil. These vapors, along with the flashed vapor from the feed, enter the 24-tray absorption section where the propane loss to the residue gas is controlled by introduction of lean oil to the top tray at a design rate of 40 g.p.m.

The reboiler receives heat by exchange with hot lean oil from the still. The bottoms from the demethanizer, containing a small quantity of ethane, 80 per cent of the propane, and essentially all of the butane and heavier components originally contained in the plant feed gas, flow through an exchanger and preheater to the still.

The residue gas from the main absorber (except that quantity used for fuel) is cooled, and dehydrated in a solid desiccant dehydration unit to meet sales gas specifications. Inert gas may be added to control the heating value at 1,000 B.t.u. per standard cubic foot before delivery for sale at 500 psig. Residue gas from the demethanizer, augmented by the required quantity of residue gas from the main absorber, is used as plant fuel.

The absorbed hydrocarbons are separated from the lean oil by steam stripping at 110 psig. in a 20-tray still. The design stripping steam requirement is 2,920 lb. per hour.

Heat is added to the still by a reheater which utilizes 400-psi. steam. The stripped lean oil flows through a heat exchanger, the demethanizer reboiler, and coolers to the lean oil surge tank from which pumps return the oil to the main absorber and the demethanizer. The hydrocarbons stripped from the oil in the still are condensed as an overhead product, the end point being controlled by reflux pumped back to the top tray. Normally, there will be no uncondensed vapors from the still accumulator because of the removal of methane and a large part of the ethane in the demethanizer.

Fractionation system.—The unstabilized gasoline from the still accumulator is pumped to the depropanizer (Fig. 6) which operates at about 310 psig. The liquid overhead product from the depropanizer, a mixture of ethane and propane, is fractionated in the deethanizer, which operates at 540 psig. to yield commercial propane as a bottom product and ethane-propane vapor overhead. The latter may be recycled through the main absorber to recover the small amount of propane it contains, or sent to the main absorber residue scrubber where it joins the residue gas going to the fuel or sales gas system.

Partially stabilized gasoline from the bottom of the depropanizer is treated with caustic for mercaptan removal and flows to the debutanizer, operating at 110 psig. The overhead from the debutanizer is condensed and the liquid butane product flows to storage through a cooler. The controlled vapor-pressure natural gasoline from the bottom of the debutanizer is cooled, sweetened, and pumped to storage.

The depropanizer and debutanizer are so designed that various product specifications may be met. The debutanizer may produce commercially pure butane or an L.P.G. product which may have a maximum vapor pressure of 100 psig. at 100° F. and contain all the recovered butane. It is also possible to produce a natural gasoline ranging from debutanized to 26-lb. R.v.p. gasoline as a bottom product from the debutanizer.

Liquid product treating.—The propane product is treated in a single-stage nonregenerative caustic contactor for removal of any H_2S which may have escaped the amine unit, dehydrated over the bauxite and then delivered to storage.

The high mercaptan sulfur content of the Embar-Tensleep gas makes it impractical to treat the gasoline in a conventional fixed-bed copper chloride treater without a pretreatment to reduce the mercaptan content, therefore, the combined butane and gasoline product of the depropanizer flows to a packed caustic contactor for removal of lower-molecular-weight mercaptans and traces of hydrogen sulfide. Spent caustic from the bottom of the contactor is regenerated by steam stripping in a packed tower. Final sweetening of the natural gasoline produced from the bottom of the debutanizer is accomplished in a fixed-bed copper chloride treater.

Drips handling.—Drips formed by condensation in the gas-collection system during cold weather and at night are pumped into a surge tank in the plant (Fig. 2). The drips are pumped from the surge tank through an amine contactor for removal of hydrogen sulfide and then join the rich oil feed to the demethanizer. Lean amine from the hydrogen sulfide removal system is charged to the contactor and rich amine is returned for regeneration.

If crude oil is present, the drips may be charged to the drips still to prevent contamination of the absorption oil. The drips still operates at 18 psig. and is designed to handle 5,000 gal. per day. A gasoline fraction is produced as an overhead product and pumped through the amine contactor to the demethanizer. The heavy bottoms product flows to the heavy-oil slop tank.

Inert Gas Generation and Injection System

One of the Elk Basin plant boilers is designed for inert gas generation. (Fig. 7.) It is equipped for close combustion control in order to operate the boiler with a small amount of carbon monoxide and no oxygen in the flue gas. Presence of oxygen is avoided throughout the inert gas system in order to prevent oxidation of the H_2S in the reservoir and possible plugging of the injection wells with elemental sulfur.

The combustion chamber of the boiler is enclosed in a gas-tight steel casing in which cool flue gas is circulated for cooling the boiler setting and preventing air infiltration. With vacuum operation avoided throughout the system in order to prevent air infiltration, the combustion chamber is operated at a positive pressure of 4-6 in. of water. An economizer reduces flue gas outlet temperature to about 400° F. A booster blower delivers the inert gas through coolers to the injection compressors at about 0.5 psig. Water condensed from the flue gas may be recovered and pumped to the cooling tower basin or boiler feedwater.

There are five four-stage, 1,200-hp. (sea-level rating), two-cycle, right-angle, gas-engine-driven injection compressors designed to compress a total of 15,000,000 standard cubic feet per day of inert gas from 12.85 to 1,525 psia. The design provides that 1,000,000 standard cubic feet per day of inert gas be withdrawn from third stage discharge for sales gas dilution to reduce the heating value of the sales gas to 1,000 B.t.u. per standard cubic foot.

The inert gas is delivered by the four stages of compression through interstage coolers and scrubbers to the field injection piping system at 1,500 psig. and 165° F. Between the second and third stages (130 psig.) of compression a solid desiccant unit de-

hydrates the injection gas, thereby eliminating potential corrosion.

Utilities

The design of the steam-generation plant is based primarily upon the production of inert gas. In generating the inert gas, the special boiler delivers 52,000 lb. per hour of superheated steam at 440 psig. and 650° F. A conventional boiler provides an additional capacity of 55,000 lb. per hour of steam at the same conditions for standby operation, but it normally operates at greatly reduced load for electric power generation. A consideration of steam and power requirements, particularly the large demand for low-pressure process steam, indicated that turbogeneration of electric power would be more economical than gas-engine generation. Consequently, high-pressure superheated steam is used to operate two 1,000-kw. generators driven by turbines of the extraction type and delivering 35 psig. process steam at extraction. The turbines exhaust at a condenser pressure of 6 in. of mercury absolute in winter and 25 in. of mercury absolute in summer. Additional 35-psi. process steam is supplied by exhaust steam from turbines driving the 470-hp. combustion air blower and the 550-hp. inert-gas blower.

Boiler makeup water is supplied by an evaporator. Since water is at a premium, oily condensate from the process area is passed through a chemical oil separator and returned to boiler feed. All return condensate and makeup water is deaerated in a spray-type feed-water heater.

An 8,500-bbl. tank is provided for water storage. The induced-draft cooling tower is designed to cool 4,000 g.p.m. from 88° to 68° F. Cooling tower makeup water from the Clark's Fork River is treated with sulfuric acid and stabilized with inhibitor.

The two turbogenerators develop electric power at 2,400 volts for the plant and the field. Power is distributed to central locations in the plant at 2,400 volts and then reduced to 440 and 110 volts. Power from the generators, supplemented by outside facilities, is transformed to 7,200 volts for transmission to the oil field.

A 50-psig. plant fuel-gas system utilizing residue gas from the demethanizer and absorber provides fuel gas for the compressors and boilers. Plant fuel gas is not dehydrated.

Storage Facilities

Approximately 10 days' storage for each of the liquid products is provided by 10 by 60-ft. horizontal cylindrical tanks adjacent to the process area. Loading pumps transfer the liquid products to a two-spot truck-loading rack. A suitable ticket house is provided. Two 500-bbl. vertical tanks provide storage for absorption oil and heavy slop oil. A pump is installed to transfer absorption oil to and from the storage tank. Also, a rerun pump is provided to pump any off-specification product back to the distillation system.

Several methods were considered for the handling and storage of sulfur. One of these was the use of a belt conveyor for atmospheric cooling and solidification, the sulfur being broken off in flakes at the end of the belt. The efficiency of this technique is attractive for long-time operation but the possibility of a market for liquid sulfur in the near future has resulted in selection of the simplest and least expensive method for initial operations.

Molten sulfur from the sulfur-extraction unit is delivered through a steam-jacketed line to the sulfur-storage area. There, the sulfur is discharged into a temporary sheet-metal vat where it solidifies by atmospheric cooling. The sheet-metal walls of the vat are raised as the sulfur hardens. When desired, the sheet metal is removed and the solid cake of sulfur is blasted, loaded into trucks, and hauled to a rail siding at Powell, Wyo., where conveyors are provided for intermittent loading into boxcars.

Conclusion

It is believed that the Elk Basin plant is an outstanding example of modern conservation practice. The project provides not only for recovery and utilization of the hydrocarbons from the sour casing-head gas, but also for pressure maintenance.

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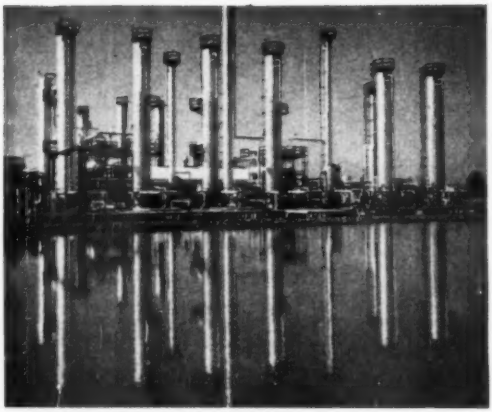

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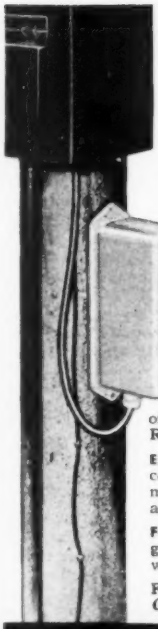

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Cost-imating

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

Blowers and Compressors

TABLE 1—FACTORS TO CONVERT COSTS ON A CUBIC-FOOT-PER-MINUTE BASIS TO COSTS ON A HORSEPOWER BASIS, AND, HORSEPOWER* TO COMPRESS 1 CU. FT. OF AIR PER MINUTE FROM ATMOSPHERIC PRESSURE TO THE PRESSURE SHOWN

Pressure (psig.)	Single-stage		Two-stage		Three-stage	
	Multiplier factor	Hp.	Multiplier factor	Hp.	Multiplier factor	Hp.
5	43.5	0.23	....	....	....	....
10	23.8	0.42	....	....	....	....
15	17.2	0.58	....	....	....	....
20	13.9	0.72	....	....	....	....
25	11.8	0.85	....	....	....	....
30	10.2	0.97	....	....	....	....
40	8.5	0.118	....	....	....	....
50	7.3	0.137	8.20	0.122	....	....
60	6.5	0.154	7.35	0.136	....	....
70	5.92	0.169	6.75	0.148	....	....
80	5.46	0.183	6.33	0.158	....	....
90	5.10	0.196	5.95	0.168	....	....
100	4.80	0.208	5.65	0.177	6.00	0.167
110	4.57	0.219	5.39	0.186	5.71	0.175
120	4.35	0.230	5.19	0.193	5.50	0.182
130	4.17	0.240	4.98	0.201	5.33	0.188
140	4.00	0.250	4.81	0.208	5.16	0.194
150	3.86	0.259	4.67	0.214	5.00	0.200
160	3.74	0.268	4.53	0.221	4.86	0.206
170	3.62	0.276	4.43	0.226	4.74	0.211
180	3.51	0.285	4.31	0.232	4.63	0.216
190	3.42	0.293	4.20	0.238	4.53	0.221
200	3.33	0.300	4.11	0.243	4.43	0.226
220	....	....	3.96	0.253	4.27	0.234
240	....	....	3.82	0.262	4.13	0.242
300	....	....	3.60	0.286	3.82	0.262
400	....	....	3.14	0.318	3.45	0.290
500	....	....	2.90	0.345	3.20	0.312
600	....	....	....	....	3.02	0.331
700	....	....	....	....	2.88	0.347
800	....	....	....	....	2.77	0.361
900	....	....	....	....	2.68	0.374
1,000	....	....	....	....	2.60	0.385
1,200	....	....	....	....	2.47	0.405
1,400	....	....	....	....	2.37	0.422
1,600	....	....	....	....	2.28	0.438

*Adiabatic compression with efficiency of 87 per cent and not corrected for the effect of the jacket cooling water.

TABLE 2—APPROXIMATE COST (DOLLARS PER CUBIC FEET PER MINUTE) OF COMPRESSORS AND BLOWERS (1948)[2]

	Capacity (cu. ft. per min.)	Material
Turbo (centrifugal) blowers*—Light duty—Motor drive:		
Single stage—0.5 psig.	100	1.08
Single stage—0.5 psig.	500- 3,000	0.16-0.34
Single stage—1.0 psig.	500- 1,000	0.43-0.65
Single stage—1.0 psig.	3,000- 9,000	0.16-0.29
Single stage—2.0 psig.	1,000- 4,000	0.42-0.67
Multistage—0.5 psig.	1,000- 3,000	0.30-0.41
Multistage—0.5 psig.	6,000-12,000	0.14-0.21
Multistage—1.0 psig.	1,000- 3,000	0.41-0.66
Multistage—1.0 psig.	6,000- 9,000	0.28-0.31
Multistage—2.0 psig.	1,000- 3,000	0.65-1.18
Multistage—2.0 psig.	6,000- 9,000	0.40-0.46
Multistage—4.0 psig.	500	2.00
Multistage—4.0 psig.	1,000- 2,000	0.95-1.35
Multistage—7.0 psig.	1,000- 1,500	2.10-2.20
Turbo (centrifugal) blowers—Heavy duty—Motor drive:		
Multistage—6.0 psig.	6,000-12,000	1.20-1.80
Multistage—6.0 psig.	24,000-40,000	0.75-0.89
Multistage—10.0 psig.	6,000	2.47
Multistage—10.0 psig.	12,000-20,000	1.50-1.80
Multistage—20.0 psig.	6,000-12,000	2.64-3.80
Multistage—20.0 psig.	24,000-40,000	1.75-2.05
Multistage—30.0 psig.	6,000-12,000	3.52-4.75
Multistage—30.0 psig.	24,000-40,000	2.64-2.87
Reciprocating (no driver or after-cooler):		
Single stage—20-30 psig.	800-1,600	2.15- 2.70
Single stage—100 psig.	400- 800	3.30- 4.90
Two-stage—100 psig.	400-1,200	5.00- 6.60
Two-stage—350 psig.	100- 400	8.00-14.00
Two-stage—500 psig.	100- 400	9.50-16.00
Three-stage—1,500 psig.	100- 300	15.00-26.50
Three-stage—2,500 psig.	100- 300	20.50-31.00

*Only $50 extra on each blower for gas-tight construction, or $100 if the size is greater than 100 hp.

TABLE 3—MISCELLANEOUS, COMPRESSOR ACCESSORIES, ETC., COSTS (1946)[1]

Equipment—	Unit	Material	Labor	M. & L.	Ref.
Diesel engines:					
1,140 hp.	$/hp.	74	9	83	4
1,800-2,400 hp.	$/hp.	61-69	....	....	4
Very large	$/hp.	38-69	....	....	3
Air filter, oil bath, 30-in.	$ each	145	....	....	1
Relief valves, backfire, 120 psig., 8-in.	$ each	18	....	....	1
Relief valves, 1-in.	$ each	7	....	....	1
Small compressor for starting large engines	$ each	585	....	....	1
Forced-feed lubricators	($14 plus $6 times number of feeds)				1

References: (1) Author's files. (2) Tyler, C., Chemical Engineering Economics, 3rd Ed., McGraw-Hill, New York, 1948. (3) Kent's Mechanical Engineers Handbook, 11th Ed., Power, John Wiley & Sons, New York (1936). (4) Perry's Chemical Engineers Handbook, 2nd Ed., McGraw-Hill Book Co., New York (1941).

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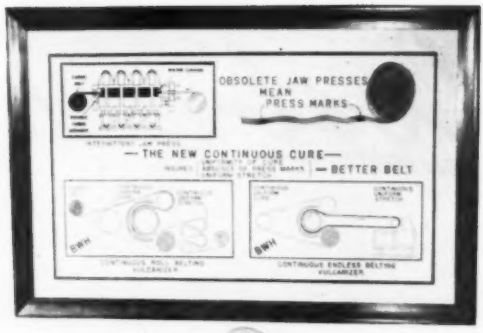

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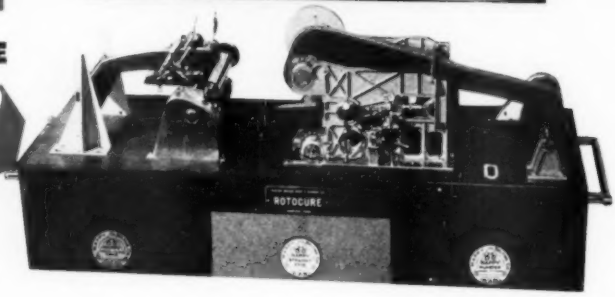

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ENGINEERING *fundamentals*

Displacement by Capillary Forces

CAPILLARY forces can act to effect the displacement of oil by water from reservoir materials under certain conditions. However, it is very common to find the action of such forces misunderstood. Actually, very little data has been procured on systems where the fluids are in motion, but certain effects can be deduced from an analysis of static systems. For want of detailed data on complex systems, one must usually consider the behavior in straight-bore capillaries.

The basis for understanding displacement by capillary forces is the capillary pressure, which in a straight-bore capillary is the equivalent of the displacement pressure. Consider a capillary filled with an oil as shown in Fig. 1(a) and closed at the top so that the water-oil level is as marked. When the top of the capillary is opened, water will displace the oil by rising in the capillary. It will not however, in general, displace the oil completely but will stop at an equilibrium position as shown in Fig. 1(b), which position represents a balance of capillary forces and gravity. Similarly, water will displace oil from a reservoir material completely filled originally with oil by an imbibition process. In this case also, the water cannot displace all the oil. There will be a final equilibrium distribution of oil and water saturations as shown by Fig. 2(c), which concept is due to Leveritt[1]. Once the fluids have reached the equilibrium positions of either Fig. 1(b) or 2(b) there is no further displacement by capillary forces possible unless the equilibrium is disturbed.

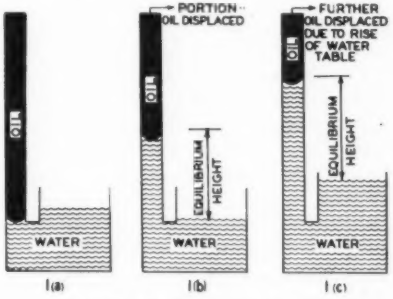

Fig. 1—Vertical displacement in a capillary

Now the situations shown in Figs. 1(b) and 2(b) are analogous to that found in a reservoir upon its discovery. Removing oil from the reservoir after it is tapped by action of capillary forces is not possible, therefore, unless there is an active water drive present. For example, if the water table in either of the two situations discussed is raised to some new level as shown in Figs. 1(c) and 2(d), then capillary forces will raise the water to a new equilibrium position. In effect, water cannot be considered as displacing oil by virtue of capillary action unless there be water available by expansion or by flow to raise the water-oil contact. Since, in a reservoir, this contact is raised only by the imposition of a pressure differential resulting from withdrawal of reservoir fluids, it is difficult to divorce the capillary effects for separate consideration.

Of course, capillary displacement need not always be considered in vertical systems. It is of interest to consider displacement in a horizontal plane also. Again discussing the straight-bore capillary, displacement can be carried to completion by virtue of the fact that there is no head of fluid to balance the capillary imbibing force. The condition before and after displacement is illustrated in Figs. 3(a) and 3(b). Likewise, imbibition can proceed over the entire length of a horizontal bed of porous material to a uniform saturation, although there is no experimental verification for presuming that the oil would be displaced completely from such a system.

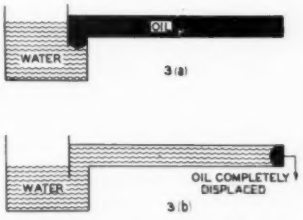

Fig. 3—Horizontal imbibition in a capillary

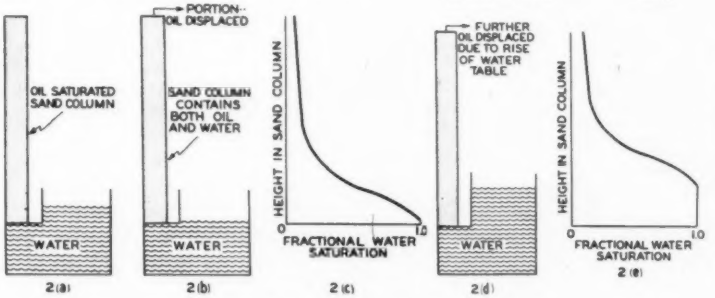

Fig. 2—Vertical displacement in a sand column

1. Leverett, Capillary Behavior in Porous Solids, A.I.M.E. Transactions, 1941, Vol. 142.

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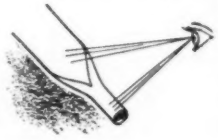

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NATURAL GAS

Southern Counties Expands Blythe Station Capacity

Southern Counties Gas Co. of California is expanding its booster station facilities at Blythe, Calif., with the installation of two new compressors to be added to the seven already in operation. This installation will raise the capacity of the station from the present 305,000,000 cu. ft. of gas daily to approximately 450,000,000 cu. ft. daily.

Blythe station is the California receiving point for the recently completed Texas to California pipe line. Panhandle and Permian basin gas is received at the station at 850 psi., and Southern Counties Gas boosts this pressure to 680-810 psi. for delivery through its California pipe-line system.

Plans for extending the system make the present increase in compressor capacity necessary. The first of several extensions planned is the recently contracted 85-mile, 16-in. line to San Diego, which will be started September 1, and which eventually will carry 40,000,000 cu. ft. of gas daily to the San Diego area.

The new compressors at Blythe develop 1,760 hp. each. Installations are scheduled for completion by October 1.

Supreme Court to Review East Ohio Gas Co. Case

The U. S. Supreme Court has granted Federal Power Commission's request to review the East Ohio Gas Co. case. FPC seeks the high court to review the decision of the United States Court of Appeals for the District of Columbia which held that East Ohio is not a natural-gas company within the meaning of the Natural Gas Act.

East Ohio opposed the commission's efforts to assert jurisdiction over the company on the grounds that it is exempt under the provisions of the act which exempts from FPC jurisdiction local distribution companies and the facilities used in local distribution.

East Ohio's operations are confined wholly within the State of Ohio and its rates and activities are completely under jurisdiction of the Ohio Commission. It receives natural gas at the Ohio border from two interstate pipe lines and distributes the gas in Ohio.

FPC contends that due to the fact East Ohio transports the gas some distance after receiving it from the interstate systems, and before beginning actual distribution, it is continuing the gas on its interstate journey; therefore, East Ohio is engaged in interstate transportation within the meaning of the Natural Gas Act.

Natural-Gas Sales Up 10 Per Cent in First Quarter

Natural-gas sales increased from 839.7 million M.c.f. in the first quarter of 1948 to 924.2 million M.c.f. in the current quarter, a rise of 10.1 per cent, the quarterly report of the American Gas Association disclosed.

Sales of gas to residential, commercial, and industrial users were up 5.7, 17.3, and 15.6 per cent, respectively.

Consumption of gas for electric generation during the first quarter as reported by Federal Power Commission totaled 98.8 million M.c.f., an increase of 13 per cent over the corresponding consumption of 87.4 million M.c.f. in the first quarter of 1948.

Total revenues from sale of natural gas to ultimate consumers rose 10.4 per cent, increasing from $324,600,000 in the quarter ended March 31, 1948 to $358,300,000 in the current quarter. Revenues from sales to industrial customers showed the largest percentage gain, 21.6 per cent.

Natural Gasoline

Construction Under Way On McAllen Cycling Plant

HOUSTON.—Contract has been let and grading for construction has started on a 75,000,000 cu. ft. capacity cycling plant in the McAllen field near McAllen, Tex. Coastal Refineries, Inc., Taylor, Tex., and Mayfair Minerals, Inc., McAllen, are the owners and the Gasoline Plant Construction Corp. is general contractor.

The plant will have a 50,000,000 cu. ft. gas cycling and a 25,000,000 cu. ft. sales gas capacity. In general charge of construction and operation will be J. L. Sewell, general superintendent of refineries for Taylor Refining and Coastal Refineries, Inc.

Brookhaven Plant to Begin Operations on August 1

August 1 is the tentative date set for initial operation of the California Company's Brookhaven, Miss., natural-gasoline plant.

The extraction plant now under construction will augment operations in the company's gas-input plant for pressure maintenance, completed previously. The gasoline plant will process 7,200 M.c.f. of gas daily to produce, in gallons daily, 9,910 of propane, 7,860 of butane and 12,460 of 26-lb. natural gasoline.

California Company's Hico-Knowles extraction plant in North Louisiana, completed the first of the year, processes 67,400 M.c.f. daily with dry gas moving to the trunk lines of Texas Eastern Transmission Corp. The plant is recovering 60 per cent of propane which amounts to 25,300 gal. daily. Other daily production includes: 21,657 gal. butanes, 80,965 gal. of 80-octane motor fuel, 16,435 gal. kerosine, and 8,793 gal. gas oil.

Above is the Blythe, Calif., compressor station of the Texas Pipeline Division, Southern Counties Gas Co. of California which is expanding its facilities by the addition of two new compressors. This will raise the station's capacity to 450,000,000 cu. ft. daily

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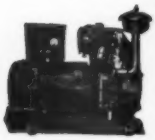

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REFINING

Improvement of General's Plant Nearing Completion

Work on three refinery-improvement projects at General Petroleum Corp.'s Torrance, Calif., plant which will conserve resources and permit more efficient operations is nearing completion, the company announced last week.

The projects, costing in excess of $400,000, include a 2,000,000-gal. pressure storage vessel (noded spheroid) to cut evaporation losses in storage of highly volatile natural gasoline; a new cooling tower to make possible recovery of a higher percentage of light hydrocarbons which are freed in the refining processes; and a new chemical-treating facility to make possible recovery of approximately 2,000 tons of lead annually which previously was lost in processing.

The spheroid is the largest pressure storage vessel and the only one of its design in the West. Standing 50 ft. high, with a diameter of 102 ft., its unique shape was dictated by necessity of strong internal bracing to withstand pressure of gasoline inside. *(see The Oil and Gas Journal, June 9 issue, page 62)*. Design will cut evaporation losses to a minimum.

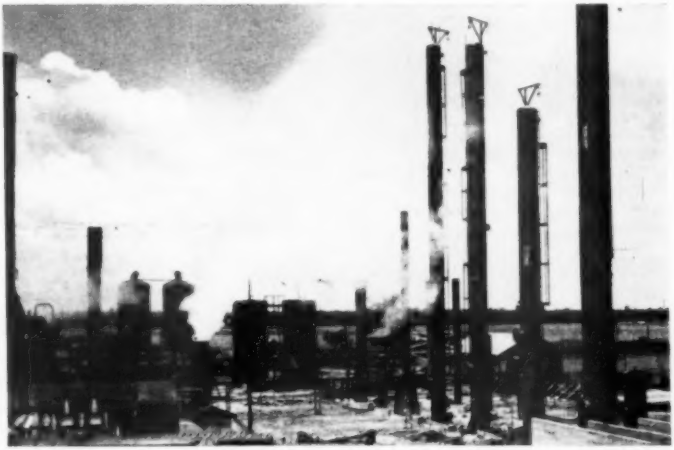
The new cooling tower installation adds to existing cooling facilities operating in conjunction with the Torrance refinery's catalytic cracking towers. By further lowering the water temperature in the cooling operations, a higher percentage of the vapors can be condensed into liquid gasoline. About 8,400 gal. additional of light petroleum fractions will be recovered daily by the operation of the new tower. Its height is 48 ft. and covers a 30 by 90-ft. area. Capacity is 11,000 gal. of water per minute.

The new chemical-treating facility is designed to reclaim lead from a special chemical used to purify gasoline. This "doctor solution" eliminates complicated sulfur compounds from gasoline which cause offensive odors. The new treating unit regenerates the solution by contacting it with heat and blown air, and the net effect is to eliminate wastage of lead, conserving the commodity for other uses.

Imperial Oil Increasing Regina Refinery Output

Imperial Oil, Ltd., plans to increase capacity of its Regina refinery to 16,000 bbl. daily by adding a tower, furnace, pumps, and exchangers to an existing unit.

The construction, which is expected to be completed within 6 months, is



Construction completion on the light ends recovery plant for the Paluxy Asphalt Co. at Yazoo City, Miss., is scheduled for early July. This photograph of the new unit shows its four columns prior to installation of piping. The Paluxy refinery is currently rated at 3,500 bbl. daily crude-oil capacity. Thermal cracking facilities for the plant are designed for a throughput of 2,000 bbl. daily

necessitated by a fire and explosion which destroyed two old crude shell stills and reduced the capacity at the plant from 15,000 to about 13,000 bbl. daily.

The company reported that the new pipe still at the Edmonton refinery, scheduled to go on stream soon, charged crude on June 17.

Sunray's Duncan Refinery Crude Unit Is Revamped

Workmen at Sunray Oil Corp.'s Duncan, Okla., refinery recently spent a week cleaning and revamping the plant's crude unit, which has a capacity of 15,000 bbl. daily.

While it was undergoing a clean out, the company decided to revamp the system to increase production of gas oil used to make higher octane fuels.

Reconditioning of the system involved changing the trays, and the company hopes to increase the yield of higher volatile components and reduce heavier ones.

New Type Locomotive Uses Heavy Residual Fuel Oil

A new type locomotive, the first new gas-turbine-electric ever built, has been initially tested successfully by General Electric Co. and American Locomotive Co. at General Electric's Erie, Pa., works. The locomotive uses diesel fuel as a starting oil, and runs on "Bunker C" fuel. The unit is being turned over to Union Pacific Railroad where it will undergo road and freight-run tests.

Powered by a 4,500-hp. Alco-G.E. unit, the locomotive carries 345 gal. of diesel starting fuel, and consumes 6,670 gal. of fuel oil for each 12 hours of operation. Lube-oil capacity is 300 gal. The power plant is a single unit and its fuel system provides large storage capacity because the turbine fuel rate is relatively higher than that of a diesel engine. It is designed to handle low-grade residual fuel, and weighs less than one-half as much per horsepower as a locomotive-type diesel engine. Only the lubricating oil requires cooling, but this only about one-tenth of the amount of cooling per horsepower required by a diesel engine.

The power unit consists of a 15-stage, axial-flow compressor, taking its air through an acoustically treated inlet housing, driven by a two-stage gas turbine. The compressed air is admitted to six combustion chambers where the fuel oil is introduced under pressure and burned. The hot gases pass directly into the two-stage turbine, and then are discharged through the roof. About 150,000 cu. ft. per minute of exhaust gases at 850° F. are discharged through the roof opening at a velocity of about 150 m.p.h.

G.E. officials state that the present power plant is inherently much less efficient than the diesel engine, but improvement in design and the use of better alloys can and will increase this basic efficiency. Moreover, the gas turbine offers considerable promise of some day burning low-grade fuels, such as coal.

The company stated that the possibilities of the locomotive in actual operation are "still a very big question mark."

Ethyl Corp. Raises Octane Number to 86 on Gasoline

The Ethyl Corp., in what it termed "signaling the end of the last postwar shortage which has restricted improvements in gasoline quality by some oil companies," has increased the required antiknock rating for all gasoline sold under the company's trademark to 86 octane number by the research test method.

The new minimum standard was made effective by 90 days' notice mailed to 189 oil companies using the trademark. H. W. Kaley, vice president, said that September 20 was the "legal requirement according to agreement" and that "actually most of these companies are already meeting these new specifications as a result of recent improvements in quality of premium gasoline."

Coal-Industry Strike May Up Residual Fuel Use

Speaking before the thirty-fourth annual convention of the National Association of Purchasing Agents in Chicago recently, Rexford S. Blazer, president of Allied Oil Co., Cleveland, stated that a strike in the coal industry would cause increased consumption of residual fuel oils, particularly by utilities.

Blazer said that current lower prices for fuel oils had already brought conversions from other fuels in an amount estimated as high as 40,000,000 bbl. per year on the Atlantic Seaboard alone. According to Blazer the oil industry expects a continued increase in the consumption of fuel oils during the next year.

Root Petroleum Planning New Delayed Coking Unit

Root Petroleum Co., El Dorado, Ark., is planning the installation of a delayed coking unit at the El Dorado refinery.

The company is understood to be considering bids at the present time from various contractors.

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PIPE LINES

Larger Edmonton-Regina Line is Being Considered

Consideration is being given by Imperial Oil, Ltd., on a 20-in. crude-oil pipe line from Edmonton to Regina instead of the 16-in. line previously announced, Henry H. Hewetson, chairman, disclosed.

The 16-in. line would carry from 100,000 to 125,000 bbl. of oil per day, and the capacity of the 20-in. line would be from 150,000 to 175,000 bbl. per day.

The company has already ordered 16-in. pipe for the 450-mile line, but if it is decided to enlarge the line, the 16-in. material could be used on the extension from Regina eastward.

Hewetson said plans for pushing the line on to the head of the Great Lakes were being advanced. Getting the crude as far as Regina would make it easier to break into new markets, but substantial relief for Alberta producers could only be obtained by extending it farther.

The company's chairman said there were definite prospects of Canada becoming self-sufficient in oil, but that would not necessarily mean no imports. It might be cheaper to bring U. S. crude into eastern Canada and send prairie crude into the U. S., leaving Canada self-sufficient on the balance.

Work Half Completed on Shell Pipe Line Co. Line

The Latex Construction Co., contractor for 41 miles of 14-in. crude-oil line for Shell Pipe Line Co. near Eunice, N. M., announced that work on the line is about half completed. Present headquarters are at Eunice, N. M.

The firm listed the following projects on which it is now engaged: 101 miles of 26-in. gas line for Texas Gas Transmission Corp., from Sharon, La., northeast to the Mississippi River south of Lake Village, Ark.; 36 miles of 8-in. crude-oil line for Texas Pipe Line Co. near Jacksboro, Tex., work just getting started; 29 miles of 22, 20, and 16-in. gas line for Interstate Natural Gas Co. west of Baton Rouge,

Workmen preparing for a creek crossing near Mouth of Seneca, W. Va., for 200-mile, 26-in. natural-gas line being constructed by H. C. Price Co. for Atlantic Seaboard Corp., and Virginia Gas Transmission Corp. in West Virginia, Virginia, and Maryland

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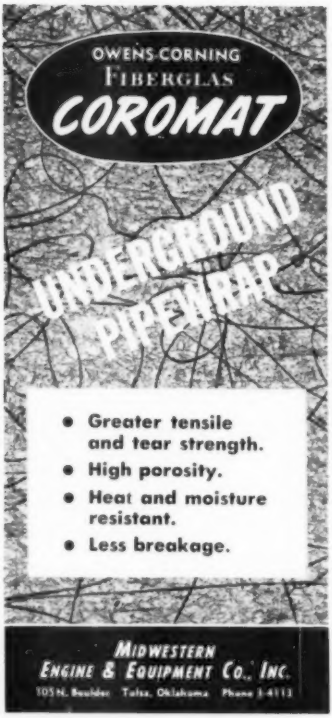

La., construction to start early in July; and construction of four pipeline pump stations for Texas Pipe Line Co. at Lindsay, Okla., Haskell, Tex., Colorado City, Tex., and Odessa, Tex.

Work Progressing on 12-in. Line to Billings, Mont.

The first and second sections of the 12-in. crude-oil pipe line from the new Silver Tip oil station to Billings, Mont., being built by Interstate Oil Pipe Line Co., have been completed with the exception of two water crossings.

Parts of the line crossing the Clark's Fork River and Rock Creek have yet to be completed, but will be laid as soon as water recedes.

There was no unusual difficulty in construction of the two sections, and work was complete on schedule. Construction on third and last section of the line will begin early in August, and work is expected to be finished by October.

Oil piped into Billings through the line will be transferred to the new Carter Oil Co. refinery at Billings by means of an 8-in. line which breaks off the main line near the old refinery. This new line has been completed and is ready to provide crude to the new refinery site. The 12-in. line also will carry oil for the new Continental Oil Co. refinery in Billings, and the Farmers Union refinery at Laurel, Mont.

At present, construction is under way on a 6-in. line between Elk Basin station and Silver Tip station, and work is scheduled to be completed momentarily.

Material is being brought in for construction of the Silver Tip station and work will get under way as soon as all materials are on hand. Chicago Bridge & Iron Co. has completed two 30,000 bbl. tanks and two 20,000-bbl. tanks at the Silver Tip site.

Water is being pumped from the

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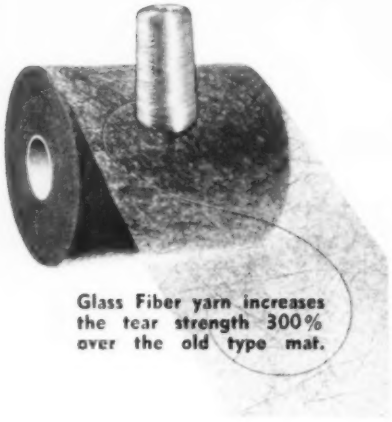

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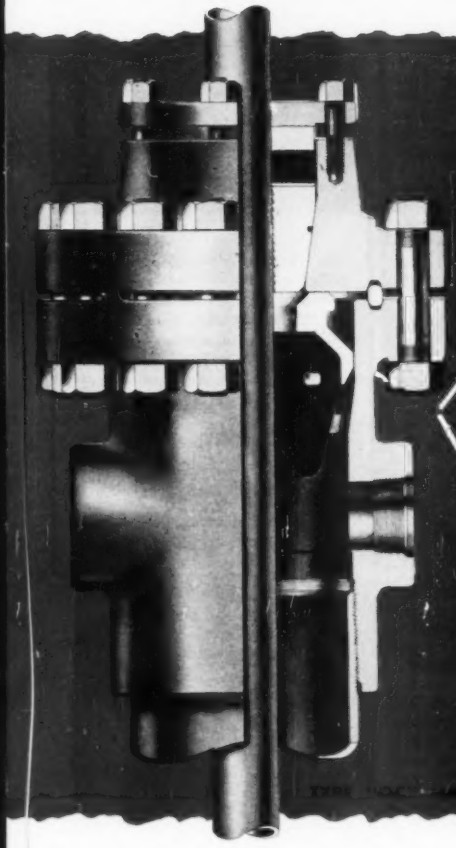

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The assembly shown above is also available with a bonnet threaded male by female for suspension of tubing . . . at an even lower price.

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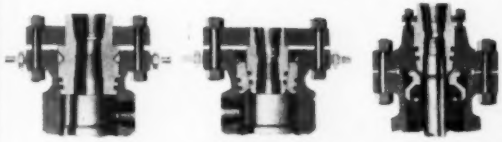

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Clark's Fork River in preparation to testing the new 12-in. crude line and the new tanks.

Tennessee Gas Transmission Sells $50,000,000 in Bonds

Tennessee Gas Transmission Co. has accepted the bid of an underwriting group, headed by Stone Webster Securities Corp., and White, Weld & Co., for purchase of $50,000,000 in first-mortgage pipe-line bonds, due in 1969. Announcement of the bid acceptance was made by Gardiner Symonds, company president, in New York last week.

Tennessee Gas will use the proceeds from the sale of bonds, along with other cash resources, for the expansion of its natural-gas pipe-line system. The system, Symonds said, which extends from South Texas to West Virginia and serves principally the Appalachian area, now has a daily delivery capacity of approximately 615,000,000 cu. ft. The firm is presently engaged in a program to increase daily capacity of 831,000,000 cu. ft., pursuant to certificates of public convenience and necessity issued by the Federal Power Commission.

In addition, a hearing is currently in progress before FPC on the firm's applications to extend its pipe line to Buffalo and to increase the aggregate capacity up to 1,060,000,000 cu. ft. daily.

The remaining cost of increasing the daily capacity to 831,000,000 cu. ft. is estimated at $73,000,000. Estimated cost of the additional facilities covered by the pending FPC applications to bring daily capacity up to 1,060,000,000 cu. ft. is estimated at $90,000,000. This involves extension of the transmission system to near Buffalo to make deliveries in eastern Ohio, Pennsylvania, and western New York.

Firm Trying to Buy Gas For Contemplated Line

The law firm of Chill, Landman & Gordon, Washington, D. C., and Jackson, Miss., is attempting to buy up a total of 6 trillion cubic feet of natural-gas reserves for an interested client, which would be used to supply a contemplated 30-in. natural-gas pipe line to be built from the New Orleans to the Chicago area.

Name of the client was not disclosed by the law firm, but it was indicated that English capital was backing the project.

Agents of the firm have been purchasing minerals and royalties in coastal and southern Louisiana for the past year, and purchases have been estimated in excess of $3,000,000. The firm said that the line would cost an estimated $300,000,000 and would operate at 1,000 psi.

Two joints of 30" pipe welded together to form a length 62' long, shown in the final Bending Stage in the "Cinch" Bender. Note how the pipe was bent continuously through the Welded Joint. This demonstration established firmly, quality on an Economical Basis.

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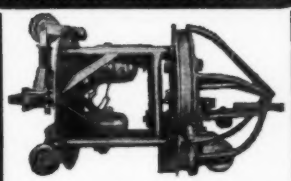

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Chill, Landman & Gordon stated that the company it represents has the pipe and the market outlet, and that right-of-way agents entered the proposed route of the line last week.

The law firm sent letters recently to holders of proven but nonproducing royalties in Louisiana stating that its client wanted to purchase reserves of 6 trillion cubic feet of gas at an approximate rate of 500,000,000 cu. ft. daily, to be delivered at 750 psi. and measured at a base pressure of 15.025 psi. at 60° F.

Work on Transcontinental Line Halted by Walkout

Work on Transcontinental Gas Pipeline Co.'s 1,840-mile Texas-New York City natural-gas pipe line was halted near Demopolis, Ala., last week by a walkout of construction workers.

Sgt. George F. Bennett, in charge of the Alabama Highway Patrol office at Demopolis, said approximately 150 workers did not go to work because of a wage dispute.

Transcontinental is laying the line between the Rio Grande Valley and New York harbor. It is to be completed in 1951, and will have an ultimate daily capacity of 505,000,000 cu. ft. of gas.

$1,750,000 Pipe Line to Salt Lake City Approved

Federal Power Commission has authorized Mountain Fuel Supply Co., Salt Lake City, to construct a natural-gas pipe line to increase deliveries in the Salt Lake Valley region. Estimated cost of the 32-mile, 20-in. line is $1,750,000.

The line is designed to boost deliveries of natural gas by approximately 23,600,000 cu. ft. It will parallel an existing 16-in. line operated by Mountain Fuel Supply, and will extend from Coalsville, Utah, to Salt Lake City.

Mountain Fuel Supply's system has a present daily capacity of approximately 111,000,000 cu. ft.

Work Begins on 50-Mile, 6-in. Michigan Crude Line

Simrall Division, Roosevelt Oil & Refining Corp., has started preliminary work on a 50-mile, 6-in. crude-oil pipe line from the Pentwater field, Oceana County, Michigan, south to Woodville in Newaygo County, where a new spur will tie in with the company's main trunk from the Kimball Lake field to Reed City station main line.

Construction contract was awarded to Somerville Construction Co., with completion date scheduled for not later than August 1.

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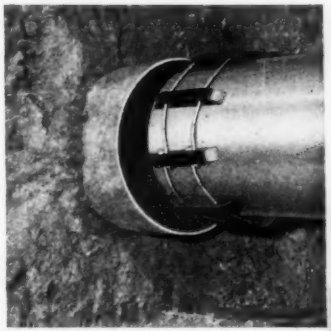

This device—simple, rugged, economical—supports and guides the leading end of coated line pipe into the right-of-way casing under railroads and highways.

Additional Casing insulators, clamped around the pipe every 20 to 30 feet, serve three purposes:
1—To protect the pipe coating.
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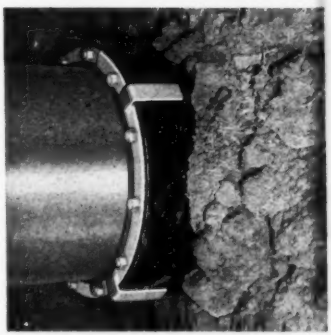
WmSEAL CASING BUSHINGS*



Equipped with exclusive T-gasket for positive watertight seal and insulation of pipe from steel flanges, this improved "casing seal" is designed for easy installation at each end of pipe-line casing under right-of-way crossings.

WmSEAL Casing bushings are readily installed because they offer:
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Exploration and Drilling

Rumors on Two Wildcats in N. Dakota Play

AS every experienced oil man knows, in a churning, trading lease play in a new oil frontier, reports and rumors about wildcat tests have to be watched very closely. The first sign of real oil can send cheap acreage prices jumping several hundred per cent and make a nice little fortune for some lucky individual with a sizable chunk of 10-cent acreage. But, while you have to watch reports closely, and perhaps keep your fingers crossed, the one thing you don't dare do is to ignore them completely.

The two wildcats that can affect a lot of acreage in North Dakota, and also in Manitoba and Saskatchewan, Canada, are Price Drilling Co. (now known as V. E. Karnes) 1 Kline, SE SE SE 16-157n-85w, Ward County, North Dakota, and Souris Valley Oil Co. 1 Gordon White freehold, SW 14-1-28w1, in Manitoba. *(See The Oil and Gas Journal, May 26, 1949, page 139, and June 2, 1949, page 95).* Both wells have set pipe, and that in itself is enough to start speculation.

The North Dakota well, on the Carpio structure, , near Minot, ran a string of 7-in. to about 6,540 ft., total depth, and cemented with 900 sacks. Pipe was perforated at 6,476-6,502 ft., with 29 holes, had a blow of hot air for about 10 minutes, no recovery. Rumors and reports are to the effect that a radioactive log showed a good kick at 5,800 ft., and another at 5,950-65 ft. Other reports are that there were signs of scattered saturation at 5,920-40 ft., and a show of oil at 5,950-65 ft. Indicated late tops are reported to be: Madison 5,660 (?), and Lodgepole (Devonian) 6,065 ft. This well was reported originally to be scheduled for 7,500 ft. and a thorough test of the Devonian. Latest reports are that other perforations and tests will be made up hole, before drilling any deeper.

The Manitoba well is at 5,160 ft., total depth, and has a string of 5½-in. cemented with 500 sacks set at 5,156 ft., now waiting on tubing. Devonian is reported to have been topped at 3,400 ft., and oil-cut mud, no free oil, recovered from two drill-stem tests, one around 3,915 ft., and the other around 4,230 ft. It is also reported to show staining at bottom.

These wells first began to attract attention a few weeks ago, at about the same time, when the Canadian well was reported to have had shows of oil in the upper portion of the Lower Cretaceous (reported top of Lower Cretaceous (?) 2,161 ft.). Just about the same time reports came filtering out that the North Dakota test had drilled saturated streaks in three different zones in the Madison lime.

Each of these reports fitted in with the characteristics of the respective sections in which they were drilling. In each case the report could be true, and if so, the signs were encouraging, although far from indicating a successful well. In an established producing area, such reports from wildcats would be strictly routine. But in virgin territory like this, they aroused tremendous interest, because if true, even if the wells were finally dry, the section had displayed some of the known earmarks of oil-producing country.

Probably any log data, sample cuts, etc., from either of these wells are being checked carefully against the available information on previous tests listed in North Dakota Geological Survey Bulletins 12, 18, and 21. They are also probably being checked against the logs of the string of dry holes Imperial Oil, Ltd., drilled in Saskatchewan a few years back, before Leduc diverted attention to Alberta. *Charles J. Deegan.*

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

ROCKY MOUNTAIN AREA.—Drilling has stopped on the world's deepest well, Superior Oil Co.'s 1 Unit at Pacific Creek, Wyoming, with total depth at 20,521 ft. It is reported that the operator is now testing below 7-in. casing cemented at 19,765 ft. Ohio Oil Co.'s Nebraska discovery, Cheyenne County, is reported pumping 17 bbl. of 35°-gravity oil per hour, and the company is preparing to spud on the second well. Carter Oil Co. and Stanolind Oil & Gas Co. are swabbing approximately 20 bbl. of 31°-gravity light oil from their Roosevelt area, Uintah County, Utah, discovery, and will acidize the zone.

SOUTH LOUISIANA.—Virtually on New Orleans' doorstep, Humble Oil & Refining Co. 1 Texas & New Orleans Railroad, wildcat 4 miles directly west of Westwego in Jefferson Parish, and approximately 10 miles from downtown New Orleans, is producing 130 bbl. of 31°-gravity oil per day through ⅛-in. choke with tubing pressure of 850 psi. The test was drilled to a total depth of 10,029 ft. and perforations at 8,183-88 ft. The well is the closest strike to New Orleans in many years.

EAST TEXAS.—A new Paluxy sand field was indicated for Kaufman County, near Cedarvale, at R. W. Fair 1 Wynne. Drill-stem test of 17 ft. of sand recovered 4,550 ft. of 29°-gravity oil, with no water.

WEST TEXAS.—Ralph Lowe 1 Brossman extended Ellenburger production ½ mile north of Barnhart field, Reagan County. Initial potential was 503 bbl. of oil a day, based on an 8-hour test of 167.7 bbl. of 44.8°-gravity oil. Ellenburger production was extended ½ mile west of Benedum field, Upton County, at Slick-Urschel 1 H. F. Neal, SW NW 14-r½-GC&SF, which flowed 593.9 bbl. of distillate, with no water, in 24 hours from open hole at 11,423-11,564 ft., total depth.

SOUTHEAST NEW MEXICO.—McAlester Fuel Co. 1-A Denton, 14 miles northeast of Loving field, 11-15s-37e, Lea County, recovered 1,710 ft. of 38°-gravity oil, 1,170 ft. of heavily oil and gas-cut mud, estimated to be 80 per cent oil, and no water, on a drill-stem test of the Wolfcamp (?) at 9,038-9,150 ft.

KANSAS

Graham County Well Makes Good Show

GRAHAM County has a new prospective pool opener at D. G. Hansen 1 Muilenberg, SE NE SE 1-10s-21w, about 2 miles south of Morel pool and about 2 miles west of Paden pool. Casing was set on top of the Arbuckle at 3,839 ft. and well drilled in to a total depth of 3,841 ft. Oil rose in the hole for a fillup of 270 ft. and after treatment with 500 gal. of acid the fillup was 1,045 ft. in 3 hours.

Sunray Oil Corp. is getting a producer at the wildcat 1 Brown, NE NE SW 28-21s-16w, just northeast of the town of Larned in Pawnee County. Casing was set on the bottom of the hole at 3,887 ft. in the Arbuckle and perforated with four holes at 3,877½-78½ ft. Well flowed at the rate of 5 bbl. per hour with gas at 4,500,000 cu. ft. per day. This prospective pool opener is about 5 miles southwest of Southwest Ash Creek pool. The oil, taken on a drill-stem test of the pay, was 46.6° gravity.

In the north central part of Stafford County and about 1 mile north of Kenilworth pool, J. D. Ferrell 1 Hahn, NW NW SW 10-22s-13w, is making an oil well. Crew swabbed 120 bbl. of oil in 8 hours from the Arbuckle at a total depth of 3,786 ft. Casing was set on top of the Arbuckle at 3,773 ft. and the pay was treated with 500 gal. of acid.

Northwest Parker pool was opened by Lindas Oil Co. and National Cooperative Refinery Association 1 Parker, SW SW SW 7-15s-12w, with a bomb potential of 833 bbl. per day from perforations in the Lansing-Kansas City at 3,086-3,102 ft. The well is northwest of Parker pool and about 1½ miles west of the southeastern tip of Hall-Gurney pool in Russell County.

On the north side of Hall-Gurney pool, Lindas Oil Co. and Murfin Drilling Co. 1-B Ehrlich, SE SE NW 17-14s-13w, is showing for a producer from the Tarkio lime. Casing was set on top of the formation at 2,397 ft. and plug drilled to 2,439 ft. The well is reported to be swabbing 6 bbl. per hour.

Roxbury pool in McPherson County has a new prospective producing zone with the deepening of a Mississippian well, National Cooperative Refinery Association 1 Jones, CNL NE NW 19-17s-1w, to the Simpson dolomite. Top of the Simpson dolomite was called at 3,278 ft. and a 15-minute drill-stem test of the next 11 ft. had a recovery of 1,380 ft. of oil. Liner has been run to the top of the dolomite.

KANSAS SUCCESSFUL WILDCATS

Rooks County: Francis Oil & Gas, Inc., et al 1 Wilson, NE NE NE 2-10s-20w, 167 bbl. of oil per day from Arbuckle at 3,823-31 ft.; Topeka 3,250 ft., Heebner 3,466 ft., Toronto 3,489 ft., Lansing 3,508 ft., Simpson 3,802 ft., TD 3,831 ft.

Kearney County: Kansas-Nebraska Gas Co. 1 Birderwell, NE NE SW 16-33s-38w, gaged 255,000 cu. ft. of gas per day from Winfield at 2,663-73 ft.; Herrington 2,609 ft., Krider 2,617 ft., lower Ft. Riley 2,754 ft., TD 2,793 ft.

KANSAS WILDCAT FAILURES

Barton County: Musgrove Petroleum Corp. 1 Tammen, SW SW NE 33-19s-15w, dry, TD 3,705 ft., Dakota 400 ft., anhydrite 918 ft., Ft. Riley 1,710 ft., Heebner 3,227 ft., Toronto 3,258 ft., lime 3,308 ft., Lansing 3,315 ft., conglomerate 3,580 ft., Arbuckle 3,647 ft.

Finlayson Drilling Co. 1 Button, NW NW NE 13-19s-13w, dry, TD 3,511 ft., Heebner 3,101 ft., lime 3,198 ft., Lansing 3,215 ft., conglomerate 3,451 ft., Arbuckle 3,478 ft.

Decatur County: Glenn Nye et al 1 Anderson, NE NE SE 32-4s-29w, dry, TD 4,414 ft., anhydrite 2,300 ft., Topeka 3,565 ft., Heebner 3,778 ft., Lansing 3,811 ft.

Ellis County: Tom Palmer 1 W. E. Smith, S S/2 SE SE 23-12s-16w, dry, TD 3,375 ft., anhydrite 1,010 ft., Lansing 3,091 ft., Arbuckle 3,354 ft.

Marion County: Deiter et al 1 Weins, SW SE SE 27-20s-2e, dry, TD 3,115 ft., Lansing 2,000 ft., basal Kansas City 2,300 ft., Mississippian 2,573 ft., Kinderhook 2,728 ft., Viola 2,909 ft., Simpson 2,986 ft., Arbuckle 3,055 ft.

Rice County: J. W. Bird 1 Major, SW SW SW 11-19s-7w, dry, TD 3,605 ft., Topeka 2,406 ft., Lansing 2,824 ft., Heebner 2,652 ft., conglomerate 3,246 ft., Kinderhook 3,267 ft., Misener 3,422 ft., Maquoketa 3,470 ft., Simpson 3,525 ft., Arbuckle 3,589 ft.

Rooks County: Brunson Drilling Co. 1 C. R. Timmons, NW NW NE 11-7s-20w, dry, TD 3,651 ft., anhydrite 1,669 ft., Topeka 3,102 ft., Heebner 3,305 ft., Lansing 3,344 ft., Arbuckle 3,598 ft.

Heathman & Honaker et al 1 Thyfault, SW SW SW 6-8s-20w, dry, TD 3,591 ft., anhydrite 1,551 ft., Heebner 3,167 ft., Lansing 3,206 ft., basal Kansas City 3,416 ft., conglomerate 3,452 ft.

Crowe Drilling Co. et al 1 2 Chesney, NE NE NW 18-8s-16w, dry, TD 3,408 ft., anhydrite 1,184 ft., Topeka 2,787 ft., Heebner 2,998 ft., Lansing 3,040 ft., Arbuckle 3,376 ft.

SOUTH LOUISIANA

Humble Finds New Pool In Jefferson Parish

NEW ORLEANS.—A new oil pool has been discovered by Humble Oil & Refining Co. 1 T&NO RR, 26-13s-22e, approximately 1½ miles west of the Westwego field, Jefferson Parish, flowing 130 bbl. of 31°-gravity oil per day through ⅛-in. choke with tubing pressure at 835 psi. The well was drilled to a total depth of 10,299 ft., pipe cemented to 9,656 ft., then hole was plugged back and production is through perforations at 8,183-88 ft.

A new gas-condensate discovery, Sun Oil Co.-Sohio Petroleum Co. 3 Lapleau Estate, in Acadia Parish, 49-10s-2w, has been made flowing 134 bbl. of 42.8°-gravity condensate per day through ⅛-in. choke, with tubing pressure of 6,500 psi. Total depth of the hole is 11,850 ft., with pipe cemented to 11,055 ft., and production is through perforations at 10,618-30 ft. The well is shut in.

Marine Oil Co. has completed the 1 M. Jones, a north offset to Barnsdall Oil Co.'s discovery in East Longville field of Beauregard Parish, 34-5s-92, confirming production for the field. Drilled to a total depth of 8,404 ft., the well is flowing 170 bbl. of oil per day through a 9/64-in. choke through perforations in the field pay at 8,328-36 ft.

Superior Oil Co. is driving piling for another wildcat in the Gulf of Mexico, approximately 35 miles offshore, Cameron Parish. It is the A-1 State Lease 1565, Block 189. Projected depth of the well is 12,000 ft.

The 31 new locations in South Louisiana this week included 4 wildcat starts, one each in Acadia, Avoyelles, Cameron, and Point Coupee parishes. There was one successful exploratory test completed in Vermilion Parish, while two were dry, one each in St. Charles and St. Helena parishes.

SOUTH LOUISIANA SUCCESSFUL WILDCAT

Vermilion Parish: New gas discovery—Pure Oil Co. 1-B St. Lse., Blk. 39, in Vermilion area, approximately 8 miles offshore, top sand 8,195 ft., TD 10,279 ft., perf. 8,195-220 ft., IP: 1.049 M.c.f. gas per day, TP 2,800 psi., shut-in well.

SOUTH LOUISIANA WILDCAT FAILURES

St. Charles Parish: Gallery & Hurt Co. 1 St. Lse. 366, southwest end of Couba Island in Lake Salvador, Twp. 15s-23e, dry, TD 11,300 ft.

St. Helena Parish: Amerada Petroleum Corp. 1 Patrick M. Needham et al, 5 miles northeast of Greensburg, 15-1s-6e, dry, TD 10,007 ft.

CALIFORNIA

Extensive Activity Reported In New Placerita Field

LOS ANGELES.—The area discovered by the Newhall Refining Co. 1 Philbert in January of this year is now known as Placerita field. This field has been very active since the discovery came in, and during the last week 32 wells were in various stages of completion with at least that many more under discussion.

At least 10 producing wells have been brought in during the past 2 weeks. The most recent completion is Gordon Oil's 3 Wickham-Ferrier, which flowed 800 bbl. of 23°-gravity oil. Total depth is 2,164 ft., with 260 ft. perforated. All 10 wells are in the 30 and 31 block of Section 4n-15w. Crawford & Hiles 1 Placerita, a possible field extension in Block 32, is now standing after a squeezing job. To the south, John Abrahams is grading for his 1 McClatchie in 6-3n-15. Guiberson Oil is down about 1,000 ft. at its 10 York in this same block, and its 5-A Shepard is completed and pumping 170 bbl. from a plugged depth of 1,510 ft. in 1-3n-16w.

Richfield Oil is rigging up for a test in the Pleito Hills, Kern County. The drilling site is west of Grapevine field and south of Wheeler Ridge field in 6-10n-20w. Independent Exploration Co. made two earlier tries in this area without success, with wells bottomed at 7,096 ft. and 4,000 ft.

General Petroleum 10 Fried will be put down in Maricopa Flat about 2 miles from Maricopa. Production is this area has all been from a brown shale formation at a depth of about 9,000 ft.

The Elkhorn Valley well, Frank R. Short 2 Melinda, is reported coring at 1,600 ft. Some shows are believed to have been located in cores taken from the interval at 1,558-78 ft.

Union Oil Co. has abandoned its 3 Wreden, 11-29s-16e, Carrizo Plains, at 3,201 ft. The test was a joint venture with Richfield Oil. Two more tests are planned by Union in this area. Gene Reid et al have passed 2,000 ft. with their 67-36 Temblor-Rexroth, Carrizo Plains wildcat. The objective sand is still ahead. This well is some distance from the Union test, location being 36-28s-18e, and close to an earlier Reid well abandoned at 2,898 ft.

A new producing zone in the Tejon Hills area has been opened by Lewis, Carla Stafford et al 2 Carla. Production in this field was discovered by Steele Petroleum 2 Roco, at 648 ft., last February. The new pay discovery pumped 50 bbl. of 18°-gravity oil per day from an oil sand topped at 2,403 ft., and had total depth at 2,465 ft. in granite. Operators' 3 Carla in the adjoining section, 29-12n-18w, has now been spudded in.

Tonopah Oil Co., Maricopa, Calif., is preparing to drill on the Travers property in NW NW NW 24-11n-28w of Cuyama Valley. So far the only production in this section is Southern California's 2 Joice, a gas producer in the southwest quarter.

An interesting test site has been set by Buttes Oil Fields, Inc., in Tehama County. The site is near Corning about 120 miles north of San Francisco, and the well will be the 1 Corning Community. Richfield has brought in several gas wells in this area, but about 5 miles to the west. A mile to the east of the new location, Chico Water Co. abandoned a venture at 671 ft.

Hancock Oil Co. 63-23 KCL marks the first abandonment in Gosford field, Kern County. The well was originally drilled to 9,540 ft., then redrilled from 6,821 ft. to 8,000 ft. The trouble is blamed on faulting. Another well will be spudded soon on the same location.

Devil's Den field may be due for a north-

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west extension. Signal Oil & Gas plans at least two wells to seek the zone brought in by Honolulu Oil's 67 Alferetz at 2,505 ft. rather than shallow production found earlier by Gilliland Oil at 460 ft.

There are two rival tests going down in the Somis area of Ventura County. Humble Oil & Refining Co.'s 1 Berylwood Investment Co. is coring at 7,180 ft., and General Petroleum's 1 Las Posas-McBean is drilling below 6,700 ft.

CALIFORNIA SUCCESSFUL WILDCATS

Monterey County, San Ardo area: Jergins Oil Co. 242-7 Hamby, 7-23s-11e, 146 bbl. of 11°-gravity oil, 0.2 cut, TD 2,315 ft., elev. 954 ft., new production about 10 mi. E San Ardo field.

San Joaquin County, Rio Vista area: Brazos Oil & Gas Co. 1 Brown, 3 Gardiner, 26-4n-3e, perforated 4,632-91 ft., 4,000,000 cu. ft. of gas, TD 4,643 ft.

Ventura County, Ojai area: Humble Oil & Refining Co. 1 T. Hammond, 18-4n-22w, on pump 189 bbl. of 25°-gravity oil, TD 4,350 ft., elev. 1,435 ft., new zone in Ojai field.

CALIFORNIA WILDCAT FAILURES

Kern County, Comanche Point area: Arvin Associates 1 Core Hole, 25-32s-29e, dry, TD 825 ft., elev. 990 ft., top granite 824 ft.

Cymric area: McCarthy Oil & Gas Co. 46 Richardson, 7-29s-21e, dry, TD 9,643 ft., elev. 1,101 ft.

Tejon Hills area: Ewan Oil Co. 3 Ewan, 2-11n-18w, dry, TD 591 ft., elev. 1,279 ft.

Steele Petroleum Corp. 3 Grizzle, 13-11n-18w, TD 142 ft., top granite 141 ft., elev. 1,333 ft.

Los Angeles County, Newhall area: C. M. S. Oil Co. 1 Cook, 12-3n-16w, dry, TD 1,540 ft., elev. 1,400 ft.

Placerita Canyon area: Crawford & Hiles 1 Placerita, 32-4n-15w, dry, TD 3,307 ft., elev. 2,270 ft.

Terminal-McBurney 1 Thompson, 36-4n-16w, dry, TD 3,990 ft., elev. 1,664 ft.

Monterey County, Watsonville area: Jergins Oil Co. 1 Blohm, 34-12s-2e, tested 1,860-1,922 ft., 1,730 ft., and 1,400 ft., dry, top granite 1,905 ft., TD 1,922 ft., elev. 413 ft.

Bradley area: B. F. Porter estate 1 Porter, 36-23s-10e, dry, TD 3,354 ft., elev. 509 ft.

Orange County, Meadowlark area: Shell Oil Co. 5-22 Kettler, 22-5s-11w, dry, TD 9,261 ft., elev. 17 ft.

San Diego County, Oceanside area: Charles F. Holmes 2 Holmes, 31-11s-4w, dry, TD 1,028 ft., elev. 20 ft.

San Luis Obispo County, Cholame area: Alphonzo Bell 1 Spring Ranch, 8-25s-15e, dry, TD 5,010 ft., elev. 2,135 ft.

Carrizo Plains area: Union Oil Co. 3 Wreden, 11-29s-16e, dry, TD 3,210 ft., elev. 1,557 ft.

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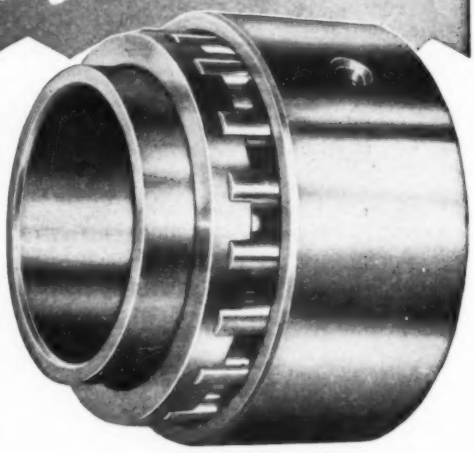

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MICHIGAN

Three Wildcats Completed As Producers in Michigan

MOUNT PLEASANT.—Three new wildcat oil discoveries were added to the Michigan 1949 record this week as W. L. McClanahan extended the new Bard Dundee pool, Gladwin County, with the best producer yet drilled in the pool, located ½ mile due west of the discovery well. Another Gladwin County wildcat, H. E. Bell 1 Fryling, Section 13-20n-1w, Butman Township, was pumping an average of 5 bbl. of oil an hour from the Dundee at a total depth of 3,602 ft. following acidization with 1,000 gal.

New discoveries were finished in Clyde Township, Allegan County; Carlton Township, Barry County; and Green Township, Mecosta County. The Bard pool well added this week, W. L. McClanahan 2 Rinehart, NW NW NW 6-17n-2w, was flowing between 18 and 23 bbl. of oil an hour from the Dundee at a total depth of 3,964 ft. following acidization with 1,000 gal. Three offset locations were announced as a result of this completion.

Ervin Major's 1 Moran, SE NE NE 2-18n-3e, Gibson Township, Bay County, the Richfield horizon well in South Adams field, which flowed as much as 140 bbl. of oil an hour before 5-in. casing was run, was being deepened in that horizon to 4,240 ft. Gas was showing, but it was believed that most of the original pay was cemented off when casing was set. The diagonal southeast offset to this well, Major's 1 Scherwin, NW SW NW 1-18n-3e, appeared to have missed a Richfield pay as well was being drilled below 4,275 ft., some 50 ft. below where pay was logged in the Moran well.

T. F. Caldwell 1 Doyle, SE NW NE 6-4n-8w, second 10-acre east test to the Carlton-Freeport discovery, Carlton Township, Barry County, was dry in the Traverse objective. Top of lime was logged at 2,026 ft. and hole was bottomed out dry at 2,074 ft.

MICHIGAN SUCCESSFUL WILDCATS

Allegan County, Clyde Township: Ohio Oil Co. 1 Jeran et al, SE SE SE 25-2n-15w, Traverse 1,276 ft., 35 bbl., TD 1,282 ft.

Barry County, Carlton Township: Fisher-McCall Oil & Gas, Inc., 1 Steckle, SE NE NW 6-4n-8w, Traverse 2,007 ft., 30 bbl. settled, TD 2,042 ft.

Mecosta County, Green Township: Joyn A. Thompson 1 Cox, NW NW NE 28-16n-10w, Traverse 2,869 ft., av. 250 bbl. oil and 1,200,000 cu. ft. gas, TD 2,890 ft.

MICHIGAN WILDCAT FAILURES

Allegan County, Wayland Township: Louis Zellman 1 Van Cura, SW SW NE 25-3n-11w, Traverse 1,693 ft., dry, TD 1,743 ft.

Arenac County, Standish Township: Frank E. Roush 1 Gibson, SE SW NE 19-18n-5e, Dundee 2,721 ft., dry, TD 2,947 ft.

Berrien County, Berrien Township: Clifford A. Perry 1 Matthews, SW SW SE 28-6s-

17w, Traverse 677 ft., dry, TD 982 ft.
Clare County, Sheridan Township: Sun Oil Co. 1 Armentrout, NE NE NE 6-17n-3w, Dundee 3,941 ft., dry, TD 4,128 ft.
Midland County, Geneva Township: C. W. Collin 1 State-Geneva et al, NW NW NE 12-15n-2w, Dundee 3,715 ft., dry, TD 4,000 ft.
Oceana County, Golden Township: Roosevelt Oil & Refining Corp. 1 Hedlund, SE SE SW 2-15n-18w, Dundee 2,198 ft., dry, TD 2,228 ft.

ROCKY MOUNTAIN

Superior Testing Below Casing at Pacific Creek

DENVER—Drilling has ceased on Superior Oil Co. 1 Unit, SW NE SW 27-27n-103w, Pacific Creek, Sublette County, Wyoming, the world's deepest well. The well was drilled to 20,521 ft., more than 1,750 ft. deeper than Superior's own previous depth record near Ventura, Calif. Casing was cemented at 19,765 ft. at Pacific Creek before drilling the well to its present depth. The wildcat is a tight hole, with no formation tops or tests released by the operator. The wildcat is believed to be in or near Sundance sand by most Rocky Mountain geologists, and the operator is now reported testing up the hole and below the casing. Various rumors of oil shows have not been confirmed, but it is believed a sizable gas show was logged at around 12,000 ft., probably in Tertiary sands.

A number of wildcats are now drilling, or are planned, for the eastern Green River Basin area, southeast of the Pacific Creek wildcat. Amerada Petroleum Corp. and Carter Oil Co. are now drilling wildcats north of the Baxter Basin fields, along the Rock Springs uplift. Sinclair Oil & Gas Co. has a block and plans drilling immediately east of Pacific Creek, at Oregon Trail. Continental Oil Co. and Husky Refining Co. are drilling on the south end of the Rock Springs uplift, at Salt Wells. Mountain Fuel Supply Co. is preparing to drill a 14,000-ft. Cretaceous test at Hiawatha, on the south end of the basin along the Colorado-Wyoming line, and Stanolind Oil & Gas Co. is now below 9,000 ft. at a wildcat in the Canyon Creek area, northwest of Hiawatha. On the west side of the Green River Basin, north of Church Buttes field, Union Oil Co. of California and others are now drilling below 11,738 ft. at their Moxa wildcat. The well is still above Dakota at present depth. Deep drilling is in prospect for other large acreage blocks throughout this basin.

On pump test of the Gurley area discovery, Cheyenne County, Nebraska, Ohio Oil Co. reported made 32 bbl. the first hour and production then settled to 17 bbl. per hour of 35°-gravity, paraffin-base oil. The well is 1 M. E. Egging, NE NE NE 11-15n-49w, 10 miles northeast of the town of Sidney. Production is from a sand between 4,401-29 ft., total depth, which is probably Muddy but is not positively identified. The well swabbed at the 17 bbl. per hour rate prior to installing pump. As a result of this discovery, leasing activity has continued at a rapid pace throughout the Denver Basin of southwestern Nebraska and northeastern Colorado. Several operators are reported leasing, as well as a number of lease brokers and royalty buyers.

Carter Oil Co. and Stanolind Oil & Gas Co. are swabbing an estimated 15 to 20 bbl. of 31°-gravity light oil from their 1 Ute Tribal, C NW SW 21-1s-1e, in the Roosevelt area, Uintah County, Utah, with fluid level at around 4,000 ft. The operator started swabbing June 22 and at the end of 17 hours the well was making 19 bbl. of fluid, 90 per cent oil, with some gas. The operators are continuing to swab and will acidize the well with 1,000 gal. prior to further tests. Production on the discovery

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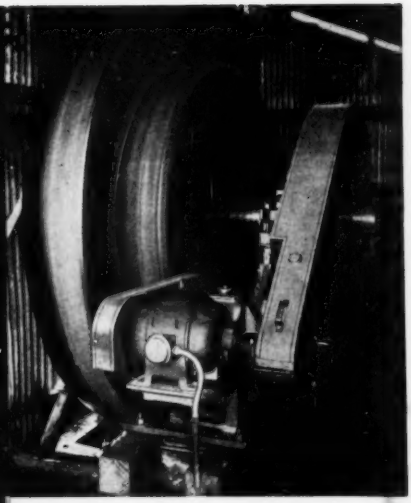

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is from a basal Tertiary zone between 9,335-9,397 ft., and the well flowed on drill-stem tests of the zone. The oil has a very high congealing point, which may be partially due to the well's not flowing following swab tests.

WOMING WILDCAT FAILURES

Lightning Creek, Niobrara County: Atlantic Refining Co. 1 State "5," 928 TD, abnd., Mowry 575, Muddy 893, Thermopolis 914.

Nowood, Washakie County—Wyoming Oil Co. et al 1 Gutz-Rooth-Govt., SE NE NW 8-48n-90w, 1,40 TD, abnd., Dinwoody 1,290, Embar 1,373, Tensleep 1,610

MONTANA WILDCAT FAILURE

Rattlesnake Butte, Petroleum County—Ike Taylor 2 Clauson, NW NW NE 27-13n-28e, 4,672 TD, abnd., 1st Cat Creek 2,375, 2nd Cat Creek 2,660-2,694, Ellis 2,995.

SOUTHWEST TEXAS

Humble Completes 125-Bbl. Well in Duval County

CORPUS CHRISTI—A new oil discovery, Humble Oil & Refining Co. 1 Enrique Garcia, 5 miles north-northwest of San Diego, Duval County, has been completed and is flowing 125 bbl. of 48.6°-gravity oil per day on potential test, through ⅛-in. choke with tubing pressure of 910 psi. The well was drilled to a total depth of 5,004 ft., and completion was made through perforations at 4,730-37 ft.

Continental Oil Co. 1 Henry Blom et al is a new wildcat test to be drilled to a depth of 10,000 ft., 4 miles north of McAllen townsite, in Hidalgo County. Location is 2 miles north of the McAllen gas-condensate field.

Baldridge & King 1 Josefa Hinojosa is testing a new deep sand section on the east flank of the LaReforma field, Hidalgo County. The well has been drilled to a total depth of 8,510 ft. and 5½-in. casing on bottom for perforation and completion test.

A new oil discovery in Williamson County, Anderson-Prichard Oil Corp. 1 Charlie Preusse, has been completed on the pump for an estimated 146 bbl. of oil per day. The well was acidized with 1,000 gal. in open hole at 1,109-38 ft., after setting casing atop the pay zone.

The 32 new locations for Southwest Texas included 10 wildcat starts, one each in Aransas, Duval, Hidalgo, Jim Hogg, Kleberg, Frio and Val Verde counties, and 3 in Webb County. There were four exploratory wells completed during the week, of which one was successful in Frio County, and one dry well each in Frio, Duval and Jim Hogg counties.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) SUCCESSFUL WILDCAT

Frio County: New oil discovery—M. L. Massingill et al 1 Rex Shuptrine, 2 miles east of Doering field, N. Nanez Sur. 1078, top sand 5,584 ft., TD 6,705 ft., producing from open hole, IP: 188 bbl. 22°-gravity oil per day through 3/16-in. choke, GOR 80, TP 25-50 psi., CP 930 psi.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) WILDCAT FAILURES

Duval County: Edwin B. Cox & Jake L. Hamon & Geo. H. Coates 1 W. R. Peters, C.C.D. Co. Sur. 66, A-693, 1½ mi. northeast of Rancho Solo field, dry, TD 2,918 ft.

Frio County: Plymouth Oil Co. 1 J. D. Oppenheimer, I&GN Sur. 8, A-408, 2 miles south of Pearsall, dry, TD 4,516 ft.

Jim Hogg County: Edwin B. Cox & Jake L. Hamon 1 Roy Yeager, AB&M Sur 167, A-28, 3 miles west of Hebbronville, dry, TD 3,572 ft.

APPALACHIAN FIELD

Rank Wildcat Staked In Preston County, W. Va.

PITTSBURGH—A rank wildcat location has been announced by Orville Eberly and William E. Snee in Reno district, Preston County, West Virginia, to be the 1 Dola E. Dever, elevation 1,508 ft., Kingwood Quadrangle, 1.1 miles south of latitude 39 degrees and 20 minutes, and 2.2 miles west of longitude 79° degrees and 40 minutes. It is on the waters of Flug Run and on the south side of United States Highway 50, approximately 1 mile west of the town of Macomber on Cheat River, and approximately 11 miles southwest of the Terra Alta section in Portland district where these same operators have been conducting drilling operations. In the Terra Alta section, Nollem Oil & Gas Co.-Snee & Eberly 1 Hugh R. and James A. Fitzpatrick, elevation 2,228 ft., are running 7-in. casing at a depth of 5,507 ft. The Onondaga lime was logged at 5,485 ft. and the chert at 5,505 ft.

In Grant district, Ritchie County, Hope Natural Gas Co. 9300 Jessie Powell, elevation 1,006 ft., was completed as a 10-bbl. well in shale, with production at 2,775-80 ft.; however, it was drilled through the Oriskany sand which was dry. A good shallow sand gas well was reported in Oceana district, Wyoming County, at the same company's 9237 Loup Creek Colliery Co., with 1,212,000 cu. ft. in the Princeton and Ravencliff sands. Total depth was 2,458 ft.

In Unity Township, Westmoreland County, southwestern Pennsylvania, Peoples Natural Gas Co. 1-3830 William Piper, elevation 2,061 ft., has shut down at 8,552 ft. and the gas pay encountered in the chert at 8,223 ft. will be acidized. In Georges

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Township, Fayette County. The Manufacturers Lilght & Heat Co. 8 Barton estate is bailing after acidizing; Orville Eberly et al 1 John Dulick tested 184,000 cu. ft. of gas after similar operations in the chert.

WEST VIRGINIA SUCCESSFUL WILDCAT

Ritchie County, Grant District: Hope Natural Gas Co. 9300 Jessie Powell, elev. 1,006 ft., 10 bbl. oil from shale at 2,775-80 ft., Corniferous lime 5,460 ft., Oriskany sand 5,656-5,760 ft., TD 5,810 ft.

N. CENTRAL TEXAS

Production Is Found in Haskell County Wildcat

WICHITA FALLS.—Haskell County was in line for Canyon limestone discovery, 7 miles from nearest production, at Stanolind Oil & Gas Co. 1 John M. Pace, 330 ft. from south and west lines of a 365-acre tract in the T. D. Owings Survey, 3 miles southeast of Haskell. In coring, operators recovered 10 ft. of saturated sand from 3,614-24 ft., total depth, then drillstem tested from 3,612-24 ft. Recovery in 1 hour was 180 ft. of oil, with no water. Operations were shut down pending decision to complete or drill ahead to the Ellenburger.

Nolan County.—Sun Oil Co. 1 Cook, SE NE 29-X-TP, 15 miles southwest of Sweetwater, recovered 25 ft. of drilling mud, with no shows, on a drill-stem test from 6,521-33 ft., open 1 hour and 45 minutes. It produced a light blow of air for part of the period. It was drilling ahead below 6,555 ft., toward the Ellenburger.

Jack County.—Additional Ellenburger oil near Postoak was reported at Mid-Continent Petroleum Corp. 1 C. E. Campsey, 4 miles southwest of the town and 1 mile southeast of the Postoak field discovery. Top of the Ellenburger was 6,277 ft., with total depth at 6,359 ft. After a treatment of 1,000 gal. of acid through perforations from 6,333-57 ft., the well cleaned itself into pits, then gaged 26 bbl. of oil an hour for 6 hours and was shut in for additional storage.

Four miles west of the Chico conglomerate field, C. J. Simpson et al 1 Lydia Chipman, R. Barr Survey, recovered 540 ft. of oil and 5 ft. of mud on a drill-stem test in conglomerate at 5,615-88 ft. The testing tool was open 105 minutes. Gas was estimated at 1,500,000 cu. ft. daily. Operators were drilling ahead below 5,760 ft., in similar limestone which indicated additional pay. Previously the well yielded 300 ft. of oil on a 1-hour test at 5,637-60 ft.

C. G. Glasscock and Pontiac Refining Co. 2 Morris, J. U. Fields Survey, northwest offset to the same companies' conglomerate discovery, was drilling below 5,719 ft. Reports indicated commercial production at 5,522-50 ft.; at 5,594-5,613 ft. the recovery in 70 minutes was 48 ft. of gas-cut mud, and in 2 hours and 45 minutes at 5,606-62 ft., the recovery was 35 ft. of mud.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCATS

Jack County: R. B. Thrift 1 Hart-Lewis Harvey Martin Sur. A-383, 1½ mi. SW of Thrift 1 Blocker, 6 mi. SE Cundiff, flowed 4,850,000 cu. ft. gas a day, open flow, top Caddo 5,024 ft., TD 5,619 ft., shut in pressure 1,300 psi.

Taylor County: West Central Drilling Co. 1 W. W. Beems, Lot 4, D. B. Corley Sur., 4 mi. N Tye, pumped 75 bbl. 38-gravity oil a day, Flippen sand 2,340-48 ft., TD 3,239 ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: Henry Grace Production Co. 1 L. F. Wilson, Blk. 60, ATNCL Sur., 10 mi. NE Archer City, dry, TD 4,220 ft.

Revier Drilling Co. 1 J. D. Bell, Blk. 108, Jefferson CSL, 5 mi. S Archer City, dry, TD 1,081 ft., Gunsight lime 1,009-12 ft.

Callahan County: Continental Oil Co. 1 O. J. Welch, Sec. 50, LAL Sur., 10 mi. SW Clyde, dry, TD 4,860 ft., Caddo 4,297 ft., Ellenburger 4,696 ft., elev. 1,919 ft.

Star Oil Co. 1-A Jackson, Sec. 523, J. O. Young Sur., 4½ mi. S Clyde, dry, TD 2,653 ft.

Coleman County: K. C. Bates 1 J. I. Henderson, Mary McCarty Sur. 167, 3 mi. SW Burkett, dry, TD 906 ft. in shale.

W. J. Nowlin 1 J. P. Marris, J. V. Massey Sur. 7, 5 mi. N Novice, dry, TD 3,689 ft., Capps 3,205 ft., Gardner 3,255 ft., Gray 3,658 ft.

Comanche County: L. I. Lynn 1 R. E. Manning, Chas. Sargent Sur., 2½ mi. SW Gustine, dry, TD 4,001 ft., Ellenburger 3,750 ft., no shows.

Cooke County: F. R. Robinson and Angle Oil Co. 2 Bend Sandmann, L. J. W. Lowery Sur., 1½ mi. S Lindsay, dry, TD 1,847 ft., Ellenburger 1,822 ft.

Jones County: S. C. Herring Drilling Co. 1 M. J. Prichard, Sec. 2, SPRR Sur., 3 mi. NW Anson, dry, TD 4,025 ft., Flippen 2,548 ft., had salt water.

Kingery-Patterson & Witherspoon 1 J. A. Walker, Sec. 97, Blk. 1, BBB&C Sur., 8 mi. NW Anson, dry, TD 3,105 ft., Flippen 2,533 ft., Swastika 3,006 ft.

Shackelford County: Deep Rock Oil Corp. 1-F Dawson, Sec. 182, ETRR Sur., 7½ mi. NE Leuders, dry, TD 1,767 ft.

Taylor County: Great Lakes Carbon Corp. 1 W. E. Beasly, 23-2-SPRR, 2 mi. S Tye, dry, TD 2,716 ft., coal 2,259 ft., dry sand 2,387, 2,415 ft.

Wichita County: M. E. Davenport 1 J. A. Coker, J. A. Eustis Sur., 2 mi. N Iowa Park, dry, TD 2,202 ft.

Young County: Paul J. Moore 1 J. M. Nail, Sec. 1997, TE&L Sur., 1½ mi. SW Loving field, dry, TD 4,475 ft., Caddo 4,214 ft.

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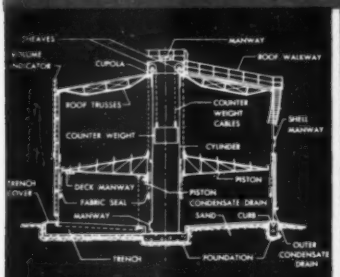

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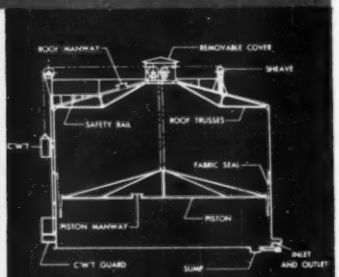

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Texas Pacific Coal & Oil Co. 1 S. H. Stoker, H. K. Glass Sur., 8 mi. SW Kendall field, dry, TD 4,796 ft., Caddo 3,602 ft., Mississippian 4,549 ft.

TEXAS GULF COAST

Small Well Completed In City of Beaumont

HOUSTON.—A new oil discovery, F. H. Carpenter et al 1 Masterson, in the city limits of Beaumont, Jefferson County, has been completed. The well was drilled to a total depth of 6,061 ft., pipe cemented to 5,694 ft., and perforated at 5,638-57 ft. The well flowed naturally for several days and died. Pump was installed on potential and the well is now pumping 23 bbl. of 28°-gravity pipe-line oil per day.

Henderson Coquat 1 W. W. & Sophia Goebel, 1½ miles north of the Gobel gas-condensate field, Live Oak County, is a new oil discovery flowing 50 bbl. of 38°-gravity oil per day through 3/16-in. choke. Total depth of the hole is 7,160 ft., and production is through perforations at 6,641-54 ft. in the Luling sand.

The Continental Oil Co. 2 Helena Bethke et al, in Thomas S. Nelson Survey, Goliad County, promises to extend South Cabeza Creek field ¼ mile southeast. A 20-minute drill-stem test from 8,299-304 ft. recovered 322 ft. of oil, 230 ft. of oil-cut mud and 506 ft. of salt water. Operators are drilling below 8,324 ft. in sand.

Final gage has been reported on the R. H. Abercrombie 1 Texas Long Leaf Lumber Co., the first gas and condensate producer in Copeland Creek field, Polk County. The well flowed 87 bbl. of 57°-gravity condensate through ¼-in. choke plus 3,750 M.c.f. of gas under tubing pressure of 2,545 psi. Open-flow gas potential was 58,000 M.c.f.

A new pay on the southwest flank of the Pierce Junction Dome in Harris County has been opened by the McCarthy Oil & Gas Corp. A-1 Jennie Settegast et al, flowing 172 bbl. of 28.5°-gravity oil per day through a 12/64-in. choke with tubing pressure of 525 psi. The well was drilled to a total depth of 7,300 ft., and completion was made through perforations at 7,234-40 ft.

The 49 new locations on the Gulf Coast included nine wildcat starts, one each in Jefferson, Matagorda, Tyler, Calhoun, Karnes, and Wilson counties and three in Jackson County. There were three successful exploratory tests completed, one each in Brazoria, Harris, and Polk counties, while 10 were dry, one each in Calhoun, Goliad, Victoria, Wilson, Harris, and Jefferson counties, and 2 each in Brazoria and Chambers counties.

TEXAS GULF COAST (DISTRICTS 2 & 3) SUCCESSFUL WILDCATS

Brazoria County: New gas discovery—Rowan Drilling Co. and Texas Gulf Producing Co. 1 J. H. Blackwell, in I&GN Sur. 27, Lot 3, A-622, 2 miles northwest of Algoa townsite, top sand 10,544 ft., TD 10,865 ft., perf. 10,554-61 ft., IP: 500 M.c.f. gas per day through ½-in. choke, TP 2,200 psi., SIP 4,900 psi.

Harris County: New pay at Pierce Junction—McCarthy Oil & Gas Corp. A-1 Jennie Settegast et al, in J. Kopman Sur., A-185, top sand 7,234 ft., TD 7,300 ft., perf. 7,234-40 ft., IP: 172 bbl. oil per day through 12/64-in. choke, GOR 200, TP 575 psi., 38.9° gravity, CP 425 psi.

Polk County: New gas-condensate sand at Copeland Creek field, R. H. Abercrombie 1 Texas Long Leaf Lumber Co., A. Viesca League, A-77, top sand 7,054 ft., TD 7,512 ft., perf. 7,054-66 ft., IP: 87 bbl. condensate per day on open flow, 57.7° gravity, TP 2,545 psi., SIP 2,840 psi.

TEXAS GULF COAST (DISTRICTS 2 & 3) WILDCAT FAILURES

Brazoria County: Floyd L. Karsten 1 C. H. Tigner Heirs, F. Bingham Sur., 3 miles

from Sandy Point, dry, TD 8,322 ft. Quintana Petroleum Corp. 1 T. L. Smith et al, J. E. B. Austin Sur., 6½ mi. southeast of E. Columbia, dry, TD 9,520 ft.

Calhoun County: C. G. Glasscock & Pontiac Refining Co. 2-A Archie W. Clark et al, Coloma Creek area, Thomas Hennessee Sur., A-74, dry, TD 8,876 ft.

Chambers County: Eastern States Petroleum Co., Inc., & The Salt Dome Oil Co. 1 Lost Lake-State Tract 2, at Lost Lake, dry, TD 4,772 ft.

Hinkle Drilling Co. 1 Paul Sherman Heirs, James McFaddin Sur., A-17, approximately 3 miles northwesterly from Turtle Bayou, dry, TD 8,800 ft.

Goliad County: Union Producing Co. 1 W. R. Taylor, North Goliad area, 7 miles northwest of Goliad, dry, TD 2,832 ft.

Harris County: W. A. Moncrief et al 1 Dooley, V. Blanco Sur., 8 miles east of Humble, dry, TD 9,015 ft.

Jefferson County: Stanolind Oil & Gas Co. B-2 Gladys City O. & G. & Mfg. Co., in southwest flank of Spindletop Dome, John Veatch Sur., A-55, dry, TD 7,145 ft.

Victoria County: P. R. Rutherford 1 Josephine Mitchell Est., Placedo Benavides Sur., A-124, 1 mile west of Lake Placedo, dry, TD 6,501 ft.

Wilson County: L. B. Horn 1 C. Katara, 3½ miles north of Falls City, dry, TD 2,699 ft.

EASTERN TEXAS

Paluxy Sand Test Seen As Probable Discovery

DALLAS.—Kaufman County was attracting attention this week, with promises of a new Paluxy sand discovery. The new well is R. W. Fair 1 Angus G. Wynne, B. S. Newman Survey, 3½ miles southwest of Cedarvale. Location is on a Shell farmout, and is 2,500 ft. east of Shell Oil Co., Inc., 1 Lumpkin, Smackover lime failure, which was said to have had oil shows in the Paluxy.

The 1 Wynne was cored from 4,967-87 ft., total depth, and recovered 15 ft. of ashy, fine-grained sand with oil stain. Driller's top on the sand was 4,965 ft. A 30-minute drill-stem test from 4,965-87 ft., using ¼-in. top and ⅝-in. bottom chokes, recovered 4,550 ft. of 29°-gravity oil. Operators were running electrical surveys before setting pipe for completion attempt.

In Wood County, Bobby Manziel 1 Maud Thompson plugged back and drilled out to 4,755 ft. in sub-Clarksville sand, and prepared to set casing.

Jackson & DeuPree 1 Carr, Colson Survey, was reported pumping all water again in testing at 4,612-38 and 4,644-50 ft.

In Franklin County, Byars & Peveto 1 Talley, SP Survey southwest of Hagensport, prepared to core around 4,350 ft. According to field reports, it was running some 15 ft. high to the 1 Tulley, earlier failure drilled 645 ft. to the southwest of the second well.

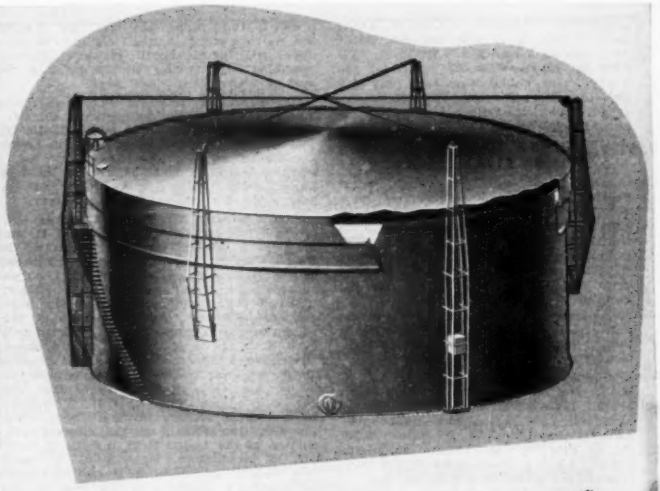
Location has been made for a Woodbine test 3 miles west of Weches and 2 miles northwest of A. D. Adams 1 Holcomb, Daniel McLean Survey, which last year made a small pumper at 5,700 ft. The new operation is carried as Ralph M. Ballard 1 Mary J. Cutler, G. W. Wilson Survey. Projected depth is 6,000 ft.

EAST TEXAS (DISTRICTS 5, 6, AND 6-P) SUCCESSFUL WILDCATS

Grayson County: J. R. and Adam Seitz 1 Williams, S. Alsberry Sur. A-17, 2 mi. SW Collinsville, pumped 20 bbl. oil a day, perforated 3,040-55, 3,040-64 ft., TD 3,848 ft., top Ellenburger 3,730 ft.

Hill County: H. L. and L. F. Boaz 1 J. T. Jones estate, 1 mi. W Mount Calm, BBB&CRR Sur., pumped 4½ bbl. 29.6-gravity oil a day, some water, pay 720-32 ft., TD.

Nacogdoches County: Humble Oil & Re-



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fining Co. 1 Thurman Crawford, Zimri Bennett Sur., 2 mi. NW Trawick, Pettit perforations 7,498-7,520, 7,527-40 ft., TD 8,257 ft., flowed 6,940,000 cu. ft. of gas a day, 7/8-in. choke, 6-hr. test, plus 37½ bbl. distillate, IP flowed 47,000,000 cu. ft. gas a day, open flow, 5 bbl. distillate per 1,000,000 cu. ft.

EAST TEXAS (DISTRICTS 5, 6, AND 6-P) WILDCAT FAILURES

Cass County: Humble 1 G. V. Guerin, James Frazier Sur., 9½ mi. NW Linden, dry, TD 7,671 ft., Nacatoch 1,860 ft., Saratoga 2,395 ft., Annona 2,685 ft., Blossom 3,193 ft., Woodbine 3,873 ft., Comanche 4,972 ft., sub-Clarksville 3,675 ft., Paluxy 4,867 ft., Glen Rose 5,315 ft., Massive anhydrite 6,555 ft., elev. 436 ft., tops by samples.

Morris County: R. N. Holbert 1 Susie Fleming, J. D. Nelson and T. D. Edmondson Sur., 2½ mi. N Cason, dry, TD 4,375 ft., Georgetown 4,375 ft., elev. 546 ft.

Rusk County: Arkansas Fuel Oil Co. 1 K. L. Barton, Harrison Graham Sur., 3½ mi. NW Garrison, dry, TD 7,192 ft., Nacatoch 1,950 ft., Austin chalk 3,100-3,355 ft., Goodland 3,690 ft., Paluxy 3,950 ft., by electric log; Massive anhydrite 5,753 ft., Travis Peak 7,183 ft. by samples.

Denton County: J. W. Baldwin 2 Hazen Armstrong, BBB&C Sur. A-198, 1 mi. SW Bolivar gas field, dry, TD 1,868 ft.

CANADIAN FIELDS

Stepout Finds Lower Cretaceous Production

CALGARY—A group of independent oil companies, headed by New Pacalta Oils, Ltd., has obtained Lower Cretaceous production at their New Pacalta-Whitemud No. 1 stepout venture ¾ mile southwest of Imperial Oil's Lower Cretaceous Whitemud oil discovery. During Cretaceous drill-stem test of interval above 4,068 ft., the well flowed oil to the surface 14 minutes after tester was opened. Production string of casing has been set to bottom 4,070 ft., and the well was perforated and given production tests yielding around 13 bbl. hourly. Gas-oil ratio was reported to be high, but specific figures are not yet available. Site is in LSD 9, 15-51-25w4.

Campbell.—Redwater Leaseholds - Campbell No. 1 wildcat in LSD 1, 28-54-25w4, about 8 miles northwest of Edmonton, has indicated oil discovery and is now continuing to run production tests. The well had drilled to the Devonian to 5,008 ft., failed to find production and plugged back to the Lower Cretaceous, where showings of oil previously had been encounterd. On swab runs, 31°-A.P.I. gravity oil is being made, with no signs of formation water present. Indications are that by placing the well on pump, a small commercial producer will be the result. However, further swabbing and testing should provide the answer during the next week.

Halfway Lake.—Sunray Oil Co. of Tulsa and the two Calgary independent oil companies, Pacific Petroleums and Atlantic Oil Co. have struck natural gas in the Lower Cretaceous at their Pacific-Sunray No. 2 venture in LSD 9, 35-59-23w4, near Halfway Lake, about 4½ miles northeast of the team's No. 1 Cretaceous gas discovery.

Pacific-Sunray No. 2 ran a Lower Cretaceous drill-stem test around 2,765 ft. and received a natural gas flow estimated at 2,000,000 cu. ft. daily. Crew continued ahead to the Devonian and are currently coring and testing in the upper horizons at 3,138 ft.

Leduc.—The team of three Calgary independents, Alberta Pacific Consolidated, McDougall-Segur Exploration, and Sunset Oils, each with one-third interest in McConset-Leduc No. 2, D3 zone oil well, has placed the new producer on production with an initial open-flow potential exceeding 1,000 bbl. daily. Located in LSD 16, 34-49-26w4, on a quarter section farmout from Imperial Oil, the well is in the southeasterly portion of the Leduc field, offsetting Home Oil Co. production. Meanwhile, the team has staked a follow-up well, McConset Leduc No. 3, ¼ mile to the west of the success. Drilling operations are expected to get under way within the next few days.

Craigmyle.—Socony - Vacuum Exploration Co. is going to drill its second follow-up test near Craigmyle, in search of oil production that was indicated at its 1948 wildcat about 6½ months ago, but failed to yield when efforts were made to place the well on production.

The new venture is Socony-Craigmyle No. 3, LSD 11, 32-32-16w4, ¼ mile due east of the fascinating Craigmyle No. 1, and ½ mile east of the No. 2 test that failed to find oil in the Madison but recorded a natural-gas discovery in the Lower Cretaceous. Primary objective will again be the Madison limestone, somewhere between 4,000 and 4,100 ft., source of the oil promise at the No. 1 venture.

Socony's second try, Socony-Craigmyle No. 2, ¼ mile west of the original venture, is currently shut in after testing the Lower Cretaceous and obtaining a gas potential in excess of 3,000,000 cu. ft. daily.

The location of Socony's Craigmyle tests is about 90 miles northeast of Calgary, around 15 miles northwest of the Hanna wet gas area, and around 50 miles southeast of the Stettler area, where Canadian Gulf discovered oil in the D2 and D3 zones of Devonian.

Wildcat abandonments.—Cal-Standard Dunmore Province No. 44-20, LSD 7, 20-10-5w4, TD 3,452 ft. Imperial-Lamoureux No. 1, LSD 12, 8-55-23w4, TD 5,010 ft.

Imperial 2 Golden Spike, LSD 2, 1-52-27w4, dry, TD 6,393 ft.

Royalite 1 Peavey, LSD 5, 29-56-25w4, dry, TD 4,452 ft.

Canadian Western 1 Pearson, LSD 14, 2-38-22w4, dry, TD 6,700 ft.

OKLAHOMA

Elk City Well Hits Gas Distillate in Deep Pay

ANOTHER Elk City well is showing as a big gas-distillate producer and this time from a deeper pay. Union Producing Co. 1-A Music, C NE SW 24-10n-21w, Beckham County, had high-liquid-content gas estimated at 25,000,000 cu. ft. per day on a drill-stem test at 13,009-13,141 ft. From an elevation of 1,843 ft. this would place the bottom of the test at —11,298 ft. A 2,980-ft. water cushion was used and the gas appeared in 40 minutes. Top-hole pressure was 2,650 psi. taken 6 minutes after gas appeared and was 2,225 psi. at the end of the 70-minute test. The well, located 1 mile east and 1 mile south of the discovery well, had both oil and gas-distillate in the upper zones.

The Kay County wildcat, Swanson et al 1 Sheets, NE SE NW 24-25n-1w, had a show of oil in the Mississippi chat. A drill-stem test taken at 4,354-63 ft. had a recovery of 30 ft. of gas and oil-cut mud. Operator is drilling ahead. The well is located a little more than 2 miles northeast of Tonkawa pool.

In another part of the Elk City field, Shell Oil Co., Inc., 1 Yelton, C NW SE 15-10n-21w, flowed 696 bbl. of 50.5°-gravity oil and 1,800,000 cu. ft. of gas in 23 hours through 24/64-in. choke. Casing is set to 9,777 ft.

Cities Service Oil Co. 1 Dacus, C NW SW 29-5n-4w, McClain County, had a show of oil and gas on a drill-stem test taken at 11,175-11,239 ft. A 2-hour test had a recovery of 200 ft. of gas and oil-cut mud plus 1 bbl. of muddy oil. Drilling is being continued below 11,250 ft. Top of the Viola lime was called at 10,534 ft.

OKLAHOMA SUCCESSFUL WILDCAT

Murray County: Rinehart 1 Hassen, SE SW NE 24-2n-3e, pumped 4 bbl. of 25°-gravity oil per day from sand at 688-742 ft., TD.

OKLAHOMA WILDCAT FAILURES

Garvin County: Carlock 1 Blackwood, NE SE NE 24-1n-1w, dry, TD 2,535 ft.

Jefferson County: Wilcox Oil Co. 1 Stone, NE NW NE 28-4s-7w, dry, TD 2,010 ft., sand 1,965-2,010 ft.

Kay County: Wilcox Oil Co. 1 Taylor, NW SW NW 22-28n-2w, dry, TD 4,710 ft., Layton 3,338 ft., Big lime-Oswego 3,745 ft., Mississippian detrital 4,130 ft., Mississippi lime 3,400 ft., Woodford, 4,507 ft., first Wilcox 4,584 ft., second Wilcox 4,694 ft.

Murray County: Pennington 1 Britt, NE NW SW 25-2n-3e, dry, TD 700 ft.

Noble County: Ashland 1 Ponca Tribe, NW SW SE 1-24n-1e, dry, TD 4,690 ft., Tonkawa 2,374 ft., Big lime 3,669 ft., Mississipian chat 4,221 ft., Mississippi lime 4,265 ft., Woodford 4,588 ft., Viola

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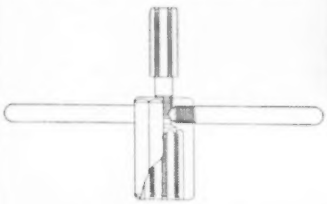

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Okmulgee County: Davidor 1 Musgrove, NW NW SW 19-13n-11e, dry, TD 3,414 ft., Inola 1,997 ft., Bartlesville 2,018 ft., Bartlesville sand 2,115 ft., lime 2,205 ft., Booch 2,386-2,400 ft., lower Gilcrease 2,618 ft., Union Valley 2,710 ft., Mayes 3,070 ft., Woodford 3,254 ft., Sylvan 3,290 ft., Viola 3,355 ft., Wilcox 3,394 ft.

Pontotoc County: Rinehart 1 Thompson, SW SW SW 20-2n-4e, dry, TD 1,020 ft.

Stephens County: McCasland 1 Williams, NW NE NE 22-1n-9w, dry, TD 2,291 ft., water sands 2,259-91 ft.

Rather 1 Brown-Kinder, NE SW NW 19-2s-7w, dry, TD 2,134 ft. (geological wildcat).

Tillman County: Bilbrey 1 Buswell, S/2 SE NW 3-2s-15w, dry, TD 1,825 ft., granite wash 730-40 ft., detrital 1,670-1,825 ft., no shows.

LA.-ARK.

Arkansas Wildcat Finds Oil Shows in Nacatoch

SHREVEPORT.—C. M. Bagley 1 Union Saw Mill, 21-19s-13w, 3,500-ft. wildcat 6 miles southwest of Strong in Union County, Arkansas, had shows of oil in the Nacatoch sand. Cores at 2,308-13 ft. recovered 5 ft. of shaly sand with oil shows and a drill-stem test from 2,305-13 ft. recovered 45 ft. of oil-cut mud, with some salt water.

In Columbia County, McAlester Fuel Co. 1-A Giles, 6-18s-18w, was waiting on cement after plugging back to 7,778 ft., from 7,876 ft. Lion Oil Co. 1 Loftin, 34-18s-18w, Union County, was drilling below 4,390 ft. It is a Smackover test.

In the North Louisiana areas, development work was holding a fairly steady pace but new exploration tests were lagging.

Bossier Parish.—McAlester Fuel Co. 1-A Waller estate, SW SW 27-18n-13w, drilling below 4,660 ft. in the lower Glen Rose. Base of the Massive anhydrite was 4,603 ft.

McKinnon, Henderson & Cherry 1 Lodwich, 25-20n-11w, was in the Glen Rose at 2,925 ft.

Caldwell Parish.—Sohio Petroleum Co. 1-C LaSalle Land Co., 27-13n-5e, had total depth at 3,790 ft., in the Midway entered at 3,600 ft. Operators were taking side-wall cores in the Wilcox, topped at 1,610 ft.

Catahoula Parish.—H. J. Strief 1 W. S. Peck, irregular Section 41-10n-8e, was drilling below 6,020 ft., in the Glen Rose. Sidewall cores in the Wilcox had no shows.

Claiborne Parish.—Hunt Oil Co. 1 J. H. Owens, NE NE 19-23n-6w, was drilling at 11,325 ft., believed to be in the Buckner.

C. R. Schuster 1 Dance, 20-19n-6w, plugged back to the Rodessa at 6,564 ft., perforated at 6,190-6,204, 6,256-98, 6,312-26 and 6,404-10 ft., acidized with 7,000 gal. and swabbed salt water in testing.

LaSalle Parish.—Justiss-Mears Oil Co. 1 J. E. Harris, NW NW 2-6n-3e, 2 miles south of the Nebo field, plugged back to 4,070 ft. from 5,359 ft., total depth. Cores at 4,004-12 and 4,024-32 ft. recovered a total of 16 ft. of Wilcox oil sand. Operators then perforated the same interval and prepared to test.

Union Parish.—Carter Oil Co. 1 Hicks, 22-21n-3w, was drilling below 8,255 ft. in the Cotton Valley. A core from 8,175-80 ft. had sand with gas odor; from 8,180-90 ft. the recovery was 5 ft. of silt, with light stains, and 6 ft. of shale.

Southwest Gas Producing Co. 1 Weldon, 24-21n-3w, was drilling in the Cotton Valley at 8,302 ft.

NORTH LOUISIANA SUCCESSFUL WILDCAT

Bossier Parish: Barnsdall Oil Co. 1 Ardis &

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Co., NE NW 27-22n-11w, dual completion, perforated Ardis sand 9,156-86 ft., (Cotton Valley), flowed 1,112,000 cu. ft. of gas a day plus 200 bbl. 55.6-gravity distillate, FTP 850 psi., shut in TP 2,850 psi., GOR 5,400 cu. ft.; perforated Bodcaw section of Cotton Valley 8,712-34 ft., in 6½ hr. flowed 190 bbl. 60°-gravity distillate, 2,980,000 cu. ft. gas, 16/64-in. choke, flowing CP 1,927 psi., TD 10,019 ft., elev. 243 ft., South Sarepta suggested field name.

NORTH LOUISIANA WILDCAT FAILURE

Winn Parish: The Texas Co. 1 I. G. Vickers, 19-12n-1e, dry, TD 3,224 ft., stratigraphic test.

MISSISSIPPI

Humble to Resume Drilling In Wildcat in Alabama

JACKSON.—Humble Oil & Refining Co. is conditioning the 1 C. E. Harrell, wildcat, in Washington County, Alabama, 41-5n-2e, at total depth of 6,379 ft. in preparation to resume drilling. The well has been shut down for the past several months due to flood water from the Tombigbee River. This is Humble's only active drilling venture in Alabama at the present time.

American Republics Corp. 1 Crosby Lumber & Manufacturing Co., wildcat in Wilkinson County, Mississippi, 31-4n-2w, is coring at 11,601 ft. Forty-four side-wall cores were taken at 5,050-8,750 ft. with no shows.

In Oldenburg field, Franklin County, Mississippi, Hodge, Gilster & Kemp are preparing to drill 2 Lehman Brothers in 27-7n-2e, which is an offset to Hawkins & Graham 1 Lehmann Brothers, discovery well for the Lower Tuscaloosa zone.

At Bude field, Franklin County, Mississippi, in 29-5n-4e, the California Co. 1 Nan Gridley, north offset to the discovery well, has been completed flowing 390 bbl. of oil per day through 13/64-in. choke, with tubing pressure of 1,200 psi. Total depth of the well is 11,028 ft. and completion was made through perforations at 11,016-27 ft.

The eight new locations in Mississippi for the week include three wildcat starts, one in Yazoo County and two in Adams County. There were no wildcat completions during the week in Alabama, Florida, Georgia, and Mississippi.

OHIO, KENTUCKY

Baker Pool Still Has Active Development

COLUMBUS.—One of the few pools with much activity remaining in the Pennsylvania Grade area is the Baker pool in southern Hopewell Township, Perry County. Initial production is high and five strings are running. The Mid-East Co. extended the pool ½ mile to the west with a producer on R. R. Weed in Section 33. The Clinton sand pay at 2,920-62 ft. made 200,000 cu. ft. and 40 bbl. natural, and 158 bbl. through a ¼-in. choke in 24 hours after shot.

M. B. Belden 1 Fred Davis, Section 13, Bethlehem Township, Stark County, extended the proven area of the pool ½ mile further east. The White Clinton at 4,561-78 ft. showed 942,000 cu. ft. natural, and 1,332,000 cu. ft. when shut in on casing 3 hours after shot. The same operator has staked a wildcat 2 miles southwest of the pool on Clarence Beitzel, in SE Section 28.

Another gasser in the West Lodi pool was brought in by William Hoey on P. T. Webster, Lot 74, Harrisville Township, Medina County. First Clinton at 2,678-90 ft. was dry, and second Clinton, topped at 2,721 ft., gaged 1,200,000 cu. ft. at 12 ft. in sand.

Locations from 13 counties totaled 18, with Washington having 4, and Stark and Noble having 2 each. Completions were down to 11 with Ashland field in the lead with 3.

EASTERN KENTUCKY

ASHLAND.—In Johnson County, 19-R-79, Ashland Oil & Refining Co. 8 Wallace Williams, deep wildcat test of Laurel Creek Dome, is fishing for tools at 5,549 ft. Drilling is expected to be resumed upon completion of recovery of tools.

It is reported that the Knox dolomite wildcat test of Jack Kindred in Lee County will be abandoned at present total depth of 3,384 ft. The Knox, topped at 2,958 ft., was found to be water bearing to total depth but operators had decided to drill deeper before abandoning. Latest news, however, is that casing will be pulled and well plugged.

Another test possibly slated for abandonment is Sam Allen et al 1 Thomas Richardson, 12-P-65, southern Morgan County. Total depth of this well is 4,447 ft. in the Knox dolomite topped at 4,261 ft. A slight show of gas and some water was all that was had in the formation.

EASTERN KENTUCKY WILDCAT FAILURE

Elliott County: Fannin & Lewis 1 Watt Kazee, right fork of Newcomb Creek, dry, TD 1,894 ft., Big lime 491 ft., Berea 962 ft., Devonian shale 1,079 ft. with show of gas, Corniferous lime 1,563 ft., Big Six 1,834 ft., 3 bbl. natural in Corniferous but failed to respond upon acidization.

WESTERN KENTUCKY

OWENSBORO.—In the area about 4 miles northwest of Owensboro, J. C. Ellis has

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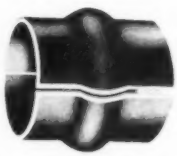

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completed 3 Coy, SE NE SW 7-P-29, Daviess County, with an initial production of 70 bbl. per day from Jackson sand at 1,458-73 ft. Pay was shot with 30 qt.

Wasson Oil Co. has spudded a 2,300-ft. McClosky test in the area about 2 miles east of the town of Guffie. The well, 1 Hugh Goodwin, C N½ SW NE 17-N-28, Daviess County, is south of scattered development in East Guffie pool.

Development south of Griffiths pool in Daviess County is indicated with Tar Springs production at Ashland Oil & Refining Co., Basin Drilling Co., and J. C. Miller 1 R. L. O'Bryan, 13-P-28. On last report, the well made 35 bbl. of oil and 5 bbl. of water from pay at 1,229-41 ft. after a 65-qt. shot. Hole was drilled to 2,002 ft. for tests of the McClosky but no production was found in the lower zones.

Earl Allgaier has staked location for a test between Smith Mills and Geneva pools in the northwestern part of Henderson County. The well, 1 Dario, 22-Q-21, is scheduled as a Cypress test and will go to about 2,400 ft.

WESTERN KENTUCKY SUCCESSFUL WILDCAT

Union County: Basin Drilling Co. and J. Burhans 1 W. Young, SW NE SE 22-O-10, IP 103 bbl., Waltersburg 1,842-52 ft., TD 1,900 ft.

WESTERN KENTUCKY WILDCAT FAILURE

Henderson County: E. L. Johnson 1 Mann estate, SE SE SW 21-R-23, dry, TD 2,450 ft.

INDIANA

EVANSVILLE.—The Gibson County wildcat, Gilliam Drilling Co. 1 William R. Stitt, NE NE NW 12-4s-10w, has been completed in the O'Hara at 2,014-18 ft. and the McClosky at 2,050-56 ft., flowing 200 bbl. per day through tubing. This new pool is about 12 miles north and slightly east of Evansville and a little more than 2 miles northwest of the town of Elberfield. The northwest diagonal offset, Gilliam Drilling Co. and Sun Oil Co. 1 Bertram, SE SW SW 1-4s-10w, is drilling at about 1,900 ft. In the past, most of the production in southern Gibson County and northern Vanderburgh has been from small pools.

Development drilling continues in Rochester pool, Gibson County, which was opened about a year ago. Ryan & Sharp completed two good Waltersburg wells on the south side of the pool. Ryan & Sharp 14 Berry, SE NE SE 14-2s-13w, made 200 bbl. per day from pay at 1,932-73 ft. and 15 Berry, SW NW SW 13-2s-13w, made 265 bbl. per day at 1,928-82 ft.

In the area about 4 miles northeast of Hatfield pool in Spencer County, George Dobbs has completed 1 Williams, SE SE SW 22-6s-7w, with an initial production of 27 bbl. from the Waltersburg at 958-68 ft. The pay was given a 30-qt. shot and casing was set at 958 ft. The new pool is about 6 miles southeast of Boonville.

INDIANA WILDCAT FAILURES

Gibson County: George Engle and Aurora Gasoline Co. 1 Mumford, SE SW NW 28-3s-13w, dry, TD 2,896 ft.

Posey County: D. W. Hartman 1 G. W. Saltzman, NW SW SW 3-6s-13w, dry, TD 2,972 ft.

Coy Oil Co. 1 Grace Aldrich, SE NW NE 8-6s-14w, dry, TD 2,642 ft.

Coy Oil Co. 1 Sampson Aldrich, SW NE NE 8-6s-14w, dry, TD 2,322 ft.

Vanderburgh County: R. Halbert and A. Cotton 1 G. E. Bauer, NE SE NW 30-6s-11w, dry, TD 2,740 ft.

Vigo County: Ohio Oil Co. 1 W. L. Pickens, NE NE SW 29-11n-8w, dry, TD 2,026 ft.

PERMIAN BASIN

Clear Fork Strike Extends Dollar Hide Field

MIDLAND.—Cities Service Oil Co. 1-E-C Cowden (formerly 1-E Cowden), SE SW 14-A52-PSL, completed from the Clear Fork section while awaiting permit for dual completion. Location is a 1-mile north extension to Dollar Hide multiple-pay field of Andrews County.

Initial flowing potential from the Clear Fork at 6,545-6,650 ft. was 492.2 bbl. of 38°-gravity oil in 24 hours, through 20/64-in. choke, with gas-oil ratio of 545 cu. ft. Flowing pressures were 495 psi. on casing and 1,250 psi. on tubing. The formation has been acidized with 5,000 gal.

Potential test had not been made on the Devonian, but earlier tests from perforations at 7,755-7,800 ft. gaged 380 bbl. of oil a day through ½-in. choke.

Five and one-half miles north and 3 miles east of Dollar Hide field, George P. Livermore, Inc., and Deep Rock Oil Corp. 1-A Mayhew, NE SE 20-A51-PSL, was drill-stem testing a section of the lower Permian which showed stains and fluorescence while drilling. At 8,199-8,255 ft. there was a steady blow of air throughout the 1-hour and 40-minute test, and recovery was 540 ft. of heavily oil and gas-cut mud, plus 2,520 ft. of gas in the drill pipe. A second test was to be made at 8,255-8,305 ft.

Coke County.—Humble Oil & Refining Co. 1 Brunson, Section 331, Nicholas Eastland Survey, was drilling ahead below 4,653 ft. in lime and shale, after recovering 210 ft. of slightly oil and gas-cut mud on a 40-minute drill-stem test at 3,554-74 ft. It produced a light blow for 35 minutes. Location is 1½ miles south and slightly east of Bronte Palo Pinto field.

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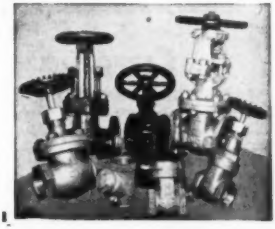

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T. W. Murray and Louis Mabee 1 L. T. Youngblood, Bronte townsite well, was drilling at 4,722 ft. in lime.

Barnsdall Oil Co. had rotary rig moved in to location for a 6,800-ft. Ellenburger test about 4 miles southeast of Blackwell. It is to be the 1 Harris Davenport, 1,980 ft. from south, and 660 ft. from east lines of the east half, Seth Clark Survey 475.

Upton County.—A new Ellenburger wildcat 3 miles south of Magnolia Petroleum Co. 1-A TXL, Pegasus field discovery, was reported in the making by Republic Natural Gas Co. Location, on a farmout from Magnolia, was expected to be in the northwest quarter of Section 6, Block 45, TP Survey.

Republic Natural 1 V. J. Powell-American Republics Corp., NW NW 44-40-T4S-TP, in the same area, was drilling ahead below 9,800 ft., in the lower Permian. It is on a 10,500-ft. Pennsylvanian contract.

On the southwest side of the Benedum area, Warren Wright 1 C. W. Chancellor, Section 5, A. W. Daugherty Survey, was drilling below 11,260 ft. after making a 1-hour and 40-minute drill-stem test in the Fusselman at 11,020-174 ft. Recovery was the 2,000-ft. water blanket, 1,460 ft. of clean oil, and 300 ft. of gas-cut drilling mud. Gas volume was estimated at 5,000,000 to 6,000,000 cu. ft. daily. Bottom-hole pressure was 1,300 psi., flowing, and 3,600 psi., shut in. The well is approximately 3 miles south of nearest completed Fusselman producer in the field. On an elevation of 2,654 ft., the 1 Chancellor had top of the Fusselman section at 11,055 ft.

Scurry County.—Unofficial field reports on Superior Oil Co. and Intex Oil Co. 1 R. H. Jordan, 579-97-H&TC, 3 miles northwest of Fluvanna, and some 10 miles northwest of the North Snyder area, credited the well with making 100 bbl. of oil in 10 hours of swabbing. Total depth was said to be 8,460 ft., in the Ellenburger. At last report the well was shut in to await outcome of a lawsuit over lease ownership.

On the east side of the south extension area to North Snyder Canyon field, Sunray Oil Corp. 3 Brown, Tract 8, Section 20, Block 1, J. P. Smith Survey, completed for a calculated initial potential of 1,560 bbl. of oil a day, flowing through ¼-in. choke from open hole between 6,500-6,806 ft. Gas-oil ratio was 716 cu. ft. Completion was without acid.

Borden County.—A second well for Good Canyon field, one location north of the discovery, was in prospect at Seaboard Oil Co. and Pan American Production Co. 3 T. J. Good, SE NW 37-33-T4N,-T&P. On a 1-hour drill-stem test from 7,917-8004 ft., gas came to the surface in 6 minutes, mud in 12, and oil in 13 minutes. The well flowed 13.8 bbl. of oil to tanks in 45 minutes, and unloaded a like amount of oil after the tool was closed. Seaboard 2 T. J. Good, a west offset to the discovery, was coring below 8,005 ft. Five miles to the east, Seaboard 1 J. B. Clayton was drilling below 4,541 ft.

Reagan County.—One-half mile north of Barnhart Ellenburger field, Ralph Lowe 1 Brossman, SE SE 221-1-TP, set casing at 9,152 ft., perforated from 9,090-9,145 ft. and washed with 500 gal. of mud acid. After running the swab four times, it kicked off and flowed at the rate of 75 bbl. of 45°-gravity oil an hour, and was shut in for completion. According to reports, the well also showed for production in the lower Permian.

WEST TEXAS (DISTRICTS 8 & 7-C) WILDCAT FAILURES

Coke County: J. K. Wadley 1 Sam Gray, NW NW NW 429-1A-H&TC, 2½ mi. N Bronte, dry, TD 5,716 ft., Strawn 5,230 ft., Ellenburger 5,533 ft., elev. 1,839 ft., Ellenburger has gas-cut mud on drill-stem test.

Crockett County: R. P. Dunn 1 L. B. Hoover, 4-NN-T&St.L Sur., dry, TD 1,590 ft.

Gaines County: Pacific Western Oil Corp. 1 Oil Development Co., SE SE 315-G-CCSD&RGNG., 2½ mi. NW Seminole field, old TD 8,043 ft., new TD 11,620 ft., Wolfcamp 9,280 ft., Mississippian 10,820 11,482 ft.

Stanolind Oil & Gas Co. 15 American ft., Pennsylvanian 10,520 ft., Devonian Warehouse Co., 5-H-D&W Sur., SW side of Cedar Lake field, old TD 11,954 ft., new TD 13,186 ft., Woodford shale 12,220 ft., Ellenburger 13,033 ft., elev. 3,455 ft.

Glasscock County: Southern Minerals Corp. 1 S. C. Houston, NW SE 13-36-T&P., 12 mi. W Howard-Glasscock field, dry, TD 4,111 ft.

Lubbock County: Amerada Petroleum Corp. 1 C. D. Bradford, SW SW 35-D7-ELRR., 7 mi. NE Mairn field, dry, TD 3,615 ft., San Andres 3,020 ft., elev. 3,228 ft.

Pecos County: Dalport Oil Co. 2 Scharrf & Blackmon, SW SW SW 2-9-H&GN., 5 mi. S Grandfalls, dry, TD 1,950 ft.

Upton County: Samedan Oil Co. 1 A. D. Neal, SE SE NW 26-B-GC&SF., ½ mi. NE Rankin, dry, TD 6,719 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—Amerada Petroleum Corp. 1-A State, SE SE 9-10s-36e, southwest of the

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Crossroads field, ran a 30-minute drill-stem test at 13,062-095 ft., in the Ellenburger. Recovery was 4,000 ft. of water blanket, 360 ft. of salt water and 630 ft. of salt water-cut mud. An 80-minute test in the Pennsylvanian at 9,666-9,872 ft. recovered 90 ft. of drilling mud with no shows. Operators plugged back from 13,123 ft. to 9,872 ft. and shut down for orders.

Mid-Continent Petroleum Corp. 1 State-Land, 12, 16-10s-36e, a south offset to Amerada's 1-CA State, had total depth at 7,198 ft., and was shut down for repairs. Mid-Continent 1-65 State, SW NW 1-12s-33e, ½ mile northeast of Amerada 1-BTA State, was drilling below 5,633 ft.

Humble Oil & Refining Co. 1-X State, NW NE 31-11s-35e, was drilling at 11,886 ft. in shale and lime. Operators' top on the Pennsylvanian was 10,565 ft., or minus 6,411 ft.

Amerada 1-BTA State, 2-12s-33e, had total depth at 11,506 ft., in dolomite, and was shut down for orders. A 1-hour drill-stem test from 11,464-506 ft. recovered 4,000 ft. of water blanket plus 635 ft. of salt water. Amerada 1 Caudle, 10-12s-33e, was drilling in lime at 10,600 ft. Amerada 1-BTB, 26-12s-33e, was drilling at 9,554 ft.

Fourteen miles northeast of Lovington, McAlester Fuel Oil Co. 1 J. M. Denton, 11-15s-37e, had total depth at 9,150 ft. Tentative top of the Pennsylvanian was 9,020 ft., on elevation of 3,799 ft. A 2-hour drill-stem test at 8,997-9,120 ft. recovered 420 ft. of slightly oil and gas-cut mud. Cores from 9,120-35 ft. had fine to coarse lime, fair to good porosity and good stain to scattered saturation. A 3-hour test at 9,038-9,150 ft. had gas in 1 hour and recovered 1,770 ft. of oil plus 1,170 ft. of oil and gas-cut mud. Flowing pressure was 750 psi., and 800 psi. shut in. Opinion was divided as to whether or not the pay was Wolfcamp or Pennsylvanian.

Ralph Lowe 1 Frank Selman, 11-19s-38e, plugged back to 7,660 ft. and was waiting on cement. Perforations at 7,500-78 and 7,592-7,645 ft. would not take acid. Operators placed additional shots at the same intervals, and with packer at 7,436 ft. acidized with 500 gal. Following the treatment, it swabbed 14 bbl. of oil in 24 hours. With packer at 7,585 ft., and treated with 5,000 gal. from 7,592-7,645 ft., it swabbed 40 bbl. of sulfur water in 10 hours. Retainer was set at 7,585 ft. and perforations squeezed.

ILLINOIS

Gallatin County Gets Two New Areas

THE central part of Gallatin County is again in the news as C. E. Skiles gets two possible pool openers. Skiles 1 S. Abel, NW SE SW 14-8s-9e, near the center of the triangle formed by Inman, North Inman, and West Inman pools, had a recovery of 660 ft. of clean oil on a 1-hour drill-stem test of the Cypress at 2,510-17 ft. Casing has been set on top of the Cypress. Skiles had an extension of Inman pool that was completed in May for 190 bbl. per day from the Tar Springs. This well, 2 Lawler, SW SW SE 13-8s-9e, is about 1¼ miles east of the new well.

To the south and on a line between Shawneetown and Ridgeway, Skiles 1 J. R. McCormick, SE SE SW 4-9s-9e, is showing for an oil well in the Pennsylvanian. A 1-hour drill-stem test at 996-1,005 ft. had a recovery of 60 ft. of oil with no water. Casing has been set on top of the tested zone.

Wayne County has a new prospective pool opener at Illinois Mid-Continent Co. 1 R. Richardson, NW NE SW 9-1n-5e, about 2 miles north of the town of Orchardville. The well had gas in 8 minutes and flowed oil in 30 minutes on a 1-hour drill-stem test of the McClosky at 2,997-3,001 ft. Casing has been set at 3,030 ft. and total depth is 3,035 ft. The well is a little more than 6 miles northwest of Johnsonville pool.

In Jefferson County, Dunbar Drilling Co. 1 Wilson, NE NE SW 20-4s-3e, is a prospective Rosiclare pool opener. A 1-hour test at 2,886-94 ft. had a recovery of 210 ft. of oil, 120 ft. of mud-cut oil, and 210 ft. of salt water. Another test at 2,943-47 ft. recovered 140 ft. of clean oil and 40 ft. of mud-cut oil with no water. The well was drilled to 2,976 ft. and plugged back to 2,947 ft. Operator continues testing the lower zone at about 2,940-45 ft.

ILLINOIS SUCCESSFUL WILDCATS

Edgar County: T. N. Hickman 1 L. Brinkerhoff, NW NW NE 10-13n-13w, IP 30 bbl., Pennsylvanian 415-68 ft., TD 469 ft.

W. W. Henigman 1 C. Waller, SE SW SW 3-13n-13w, IP 100 bbl., Pennsylvanian 394-402 ft., TD 456 ft.

Coles County: B. W. Quick 1 B. Steele, NW NW NW 17-12n-14w, IP 2 bbl., Pennsylvanian 488-504 ft., TD 507 ft.

Gallatin County: Van Tuyl and Gilpin 1 Wilson, SE NE SE 36-7s-9e, IP 108 bbl., McClosky 2,820-30 ft., TD 2,956 ft.

ILLINOIS WILDCAT FAILURES

Bond County: Paul Doran 1 Mills, NW SE NW 32-5n-3w, dry, TD 1,206 ft.

Hancock County: Dale Lambert 1 Michaels, C N½ NW SE 26-4n-5w, dry, TD 436 ft.

Macoupin County: Joe Kesl, Jr. 1 L. Noel, SE SE SE 19-7n-7w, dry, TD 660 ft.

Madison County: G. A. Isaacson 1 H. E. Dorsey, C S½ S½ 29-6n-8w, dry, TD 1,800 ft.

Marion County: H. F. Robinson 1 Jones, NW SW SW 6-5n-2e, dry, TD 1,836 ft.

Saline County: Dee Miller Drilling Co. 1 J. Bona, SW NW SW 23-8s-5e, dry, TD 3,107 ft.

Wayne County: W. O. Lucas 1 Hushiner, SW SW SE 12-1n-5e, dry, TD 3,153 ft.

NATASCO NATASCO NATASCO

New Completion Record Established In May, With Total of 3,143

by Polly DeArmond

MAY bested January as the record holder for number of wells drilled, with operators reporting more than 3,100 monthly completions for the first time this year. There were 3,143 completions, of which 63.2 per cent were successful in finding oil or gas, and 36.8 per cent resulted in dry holes (including those drilled specifically as service wells). However, total footage of 11,231,359 ft. for the month dropped some 387,000 ft. from the year's record, which was established in March with 11,618,579 ft.

Record completions for the year were also noted in three individual areas. The North Central section, made up of Ohio, Indiana, Kentucky, Illinois, and Michigan, reported 610 wells for the month, compared with the previous high of 542 in January. The Mid-Continent division, including Oklahoma, Kansas, Nebraska, and Missouri, had 706 completions as against 655 in April. The Pacific Coast showed 244 wells finished during May, a gain of 22 wells over that area's April record of 222.

The Texas-New Mexico area reported the greatest gains for the 5-month period, with a 13.7 per cent increase in completions, and a 14.6 per cent increase in footage. The North Central section was up 9.3 per cent in wells, and 6.9 per cent in depth drilled, and the Mid-Continent division gained 3.9 per cent in completions and 7.6 per cent in footage. Cumulative completions for the Southern states were off 6 per cent, but deeper drilling in Louisiana, Mississippi, and Arkansas raised the footage 7.4 per cent.

Five month's work declined in the Appalachian fields. Five-month tabulations for New York, Pennsylvania, West Virginia, and Virginia reflect that those states slumped 26.8 per cent in completions, and a proportionate 26.6 per cent in footage. The Rocky Mountain region (Montana, Wyoming, Colorado, and Utah) was off 5.4 per cent in wells and 4.1 per cent in total depth drilled. Completions in California dropped 9 per cent, but footage was down only a negligible amount.

Total wells in May decreased 114, or 3.5 per cent, from the figure for that month of last year, and wells drilling at the end of the month was off 76. This "rigs and drilling" figure, which maintained a steady climb in 1948, also took a sharp dip from March and April of this year.. Footage, however, was up 300,972 ft., or 2.7 per cent, over that drilled for May 1948.

In the comparison of completions during 1949 with 1948 by months, January was down slightly from the corresponding month of last year, February was practically the same as February 1948, and March and April were both higher than the same months of the previous year. The industry is anticipating a decline in operations from last year on such a month-vs.-month basis, and the drop in completions in the May analysis seems to bear out this expectation.

SUMMARY OF COMPLETIONS, MAY 1949

	Total comp.	Oil	Gas	Dry	Under 2,500 ft.	2,500-5,000 ft.	5,000-7,500 ft.	7,500-10,000 ft.	10,000-12,500 ft.	Over 12,500 ft.	Total footage	Rigs and drilling
New York	47	24	0	23	47	0	0	0	0	0	68,089	114
Pennsylvania	129	65	14	50	116	13	0	0	0	0	220,712	238
West Virginia	§34	2	§29	3	12	§21	1	0	0	0	103,809	185
Ohio	90	33	21	36	54	34	2	0	0	0	185,618	114
Indiana	142	68	2	72	122	20	0	0	0	0	275,074	119
Kentucky	76	28	21	27	56	20	0	0	0	0	139,817	49
Illinois	235	122	0	113	84	151	0	0	0	0	594,098	325
Michigan	58	30	1	27	43	15	0	0	0	0	119,045	135
Kansas	304	170	9	125	34	270	0	0	0	0	998,943	434
Neb., Mo., Iowa	2	2	0	0	1	1	0	0	0	0	5,008	11
Oklahoma	400	207	27	166	127	186	74	9	4	0	1,417,104	628
Texas	1,062	623	91	348	253	488	212	82	23	4	4,427,625	1,341
North	181	99	1	81	76	80	25	0	0	0	520,589	170
West Central	176	80	3	93	57	101	18	0	0	0	536,201	186
West	270	229	3	38	56	122	55	29	8	0	1,259,891	426
Panhandle	96	37	52	7	3	93	0	0	0	0	296,706	93
East	57	26	6	25	4	30	16	6	1	0	286,005	62
Gulf Coast	151	82	22	47	10	38	50	36	13	4	971,994	235
Southwest	131	70	4	57	47	24	48	11	1	0	556,239	169
Louisiana	145	93	8	44	55	10	18	30	27	5	904,806	263
Northern	71	48	7	16	52	6	8	3	2	0	234,518	91
Southern	74	45	1	28	3	4	10	27	25	5	670,288	172
Arkansas	24	15	0	9	6	14	1	3	0	0	87,109	29
Mississippi	28	14	0	14	1	2	14	3	8	0	208,046	28
Ala., Ga., Fla.	2	0	0	2	0	2	0	0	0	0	7,690	6
Tennessee	5	1	0	4	5	0	0	0	0	0	5,119	6
Montana	15	9	1	5	5	9	0	0	1	0	48,401	87
Wyoming	45	21	1	23	3	25	10	4	2	1	210,448	145
Colorado	8	1	0	7	4	1	3	0	0	0	27,648	32
Utah	6	5	0	1	0	4	0	1	0	1	25,656	24
New Mexico	42	26	6	10	9	21	4	7	0	1	184,193	126
California	244	198	1	45	96	73	40	21	11	3	967,301	246
Total May 1949	3,143	1,757	232	1,154	1,133	1,380	379	160	76	15	11,231,359	4,685
Total April 1949	3,083	1,726	235	1,122	1,120	1,273	421	171	80	18	11,267,200	4,805
Total May 1948	3,257	1,870	213	1,174	1,366	1,325	328	162		76	10,930,387	4,761
Cumulative 1949	14,838	8,388	1,048	5,402	5,383	6,205	1,924	882	381	63	54,171,361	
Cumulative 1948	14,607	8,440	1,072	5,095	5,825	5,934	1,708	764		376	50,652,194	

*Incl. 85 service wells: N. Y. 23, Pa. 46, Ohio 3, Ind. 2, Ky. 2, Ill. 1, Kans. 2, Okla. 3, No. Tex. 2, Tex. Gulf. 1. †Incl. 22 distillate wells: Okla. 3, W. Tex. 2, Tex. Gulf 9, No. La. 2, So. La. 5, Ark. 1. ‡Incl. all wells rigged up and/or drilling at end of month (W. Va. incl. 4 Va. rigs, Wyo. incl. 3 Dak. rigs). §Incl. 1 Va. at 3,870 ft.

Ball Opposes Granting Of Big Loan to Mexico

(Continued from page 33)
development is the American, British, and Dutch oil companies, and only by opening the door to all of them can the necessary competition in exploration and development be obtained.

"Given terms that offer adequate incentives," Ball asserted, "they would provide the necessary capital, and the equally necessary diversity of competitive judgment. They would find, develop and produce the oil. They would profit, and so would Mexico, and so would the security of the United States and the Western Hemisphere.

"To offer the necessary incentives, Mexico would not have to change her constitution. She might have to change her laws. She would have to change her attitude toward competitive development by foreign capital. She would have to welcome such development, not forbid or resent it.

"We have no right to tell Mexico what economic policy she should follow. We should not attempt to do so, either directly or through conditions attached to proposed loans.

"We have the right, however, to decide whether a proposed loan is good or bad, and not to make it if we do not think it is good.

"If Mexico of her own will, without pressure or attempted dictation from the United States, should decide to open wide her doors to competitive development of her oil resources, on terms that would insure the entry of enough foreign companies to do the job—not just one or two or three companies, but companies comparable in number and activity to those now exploring western Canada—then a loan of enough money to modernize and expand her refining and distribution facilities would probably be a good loan.

"Short of such a decision, I believe that any oil loan to Mexico would be a disservice to both countries."

Effective Dates on New Tax-Status Regulations Set by Revenue Bureau

WASHINGTON.—The Bureau of Internal Revenue last week set the effective dates for application of its new regulations on the tax status of joint operating agreements *(The Oil and Gas Journal, December 9, 1948, page 46, and April 14, 1949, page 69)*, which cover the types of unit agreements that will be subject to taxation as corporations.

In a memorandum of advice for the industry, the bureau said:

"It is the opinion of this office that where joint operators acting as a unit have established a separate accounting period for their joint operation and are presently filing partnership returns on that basis, amendment of the joint operating agreement prior to the first day of the accounting period of the joint operation beginning on or after July 1, 1949, will establish noncorporate status without results attending a corporate liquidation. The recognition of a joint operation under the cited I.T.'s (setting forth the rules) as an association taxable as a corporation does not permit a change in its established accounting period without the approval of the commissioner.

"Where no separate accounting period has been established for the joint operation, unless an election is made to use a fiscal-year basis, the status of the joint operation will be determined on the basis that it has a calendar-year accounting period, in which event an amendment of the joint operating agreement made prior to January 1, 1950, will be regarded as timely under the cited rulings.

"The accounting periods of the participants in the joint operation are immaterial to the classification and treatment of the joint operation under I.T. 3930."

Texas Co. Asks Permission To Consolidate Four Fields

AUSTIN.—On July 13 the Railroad Commission will hold a hearing on the application of The Texas Co. to consolidate the Ganado, Ganado deep, Harmon, and Mayo fields, all in Jackson County.

In its application, the company asked that "the field rules for the Harmon field be adopted for the area and that common storage of oil from all reservoirs produced from wells on any one lease be permitted." Different maximum efficient rates of production and allocation formulas for each reservoir were asked.

Senate Gets Bill to End Premiums on Royalty Oil

WASHINGTON.—The Senate Interior and Insular Affairs Committee voted last week to send to the Senate floor legislation to eliminate premium payments on contracts to purchase government royalty oil entered into under the act of July 13, 1946, which gave independent refiners without adequate crude resources first call on the oil.

The legislation is based on complaints that the current crude situation makes payment of the premiums a burden on the small refiners, contrary to the present practice of the Interior Department of selling its royalty oil from the public lands at the market price.

Big Gain in Production Of L.P.G. Is Forecast

PRODUCTION of liquefied petroleum gases is expected to reach 186,400 bbl. daily in July of this year and 190,000 bbl. daily by July of next year, compared with 159,500 bbl. daily in 1948, G. L. Brennan, manager of the L.P.G. division of Warren Petroleum Corp., declared in a fuels forum at the recent convention of the National Association of Purchasing Agents in Chicago.

Transportation equipment, he said, will be ample to deliver these increased quantities to points of use. An extremely cold winter in the southern states, however, would place a burden on cars and bulk-storage facilities, he said.

Brennan emphasized that any estimate of future production of L.P.G. must take into account several factors. These include, he said, the effect of allowable crude-oil production and gas-oil ratios; natural-gas production from dry-gas wells such as in the Panhandle and Hugoton fields; recycle plant ratio of production to quantity returned to the formation; and the volatility of motor gasoline, which, if increased, could easily shorten the supply of butanes available for other markets.

Brennan outlined the recent cycle of market values of L.P.G., pointing out that the price of the products in the Mid-Continent was frozen at 2¼ to 2½ cents per gallon during the war, but between late 1946 and late 1947 rose to 6 to 6½ cents, following the increasing crude-oil prices.

Then, as a result of mild winter and increased production and transportation facilities, prices have lowered "almost to prewar levels and some excess material is being offered at distress prices, while at the same time the crude-oil market in the Mid-Continent area has remained comparatively stable.

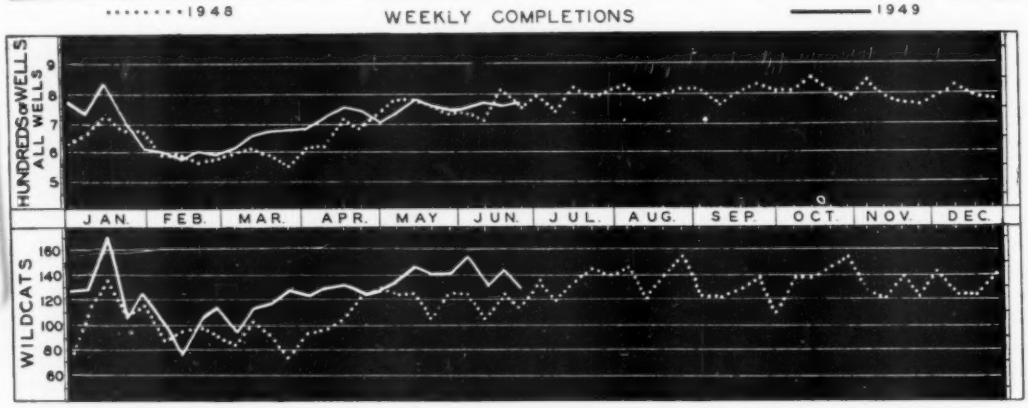
"The practice of buying and selling on the basis of crude-oil markets apparently does not provide consistent satisfaction to all concerned," Brennan said.

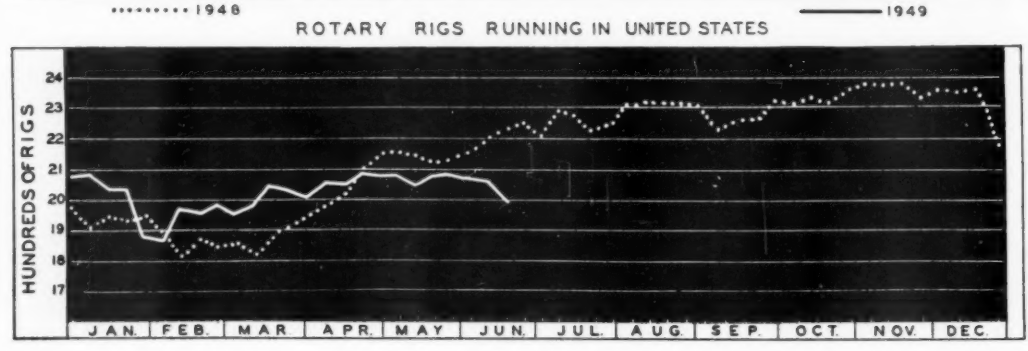
The period of high prices, he added, had a "material influence" on available supplies, resulting in increased construction of facilities to extract more propane and a greatly increased number of gasoline and recycle plants.

WEEKLY WELL COMPLETIONS . . . WEEK ENDED JUNE 25, 1949

	Total of all wells					25 wk.		Wildcat completions and discoveries					Cumulative total, 1949				
	Comp.	Oil	Gas	Dry	Footage	1949	1948	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	11	5	0	*6	12,422	549	729	0	0	0	0	0	0	0	0	0	0
Pennsylvania	21	8	6	*7	41,080	788	1,243	0	0	0	0	0	0	0	1	1	2
West Virginia	6	1	5	0	22,909	230	361	1	0	0	0	1	1	0	5	6	12
Ohio	11	2	3	†6	26,903	500	616	0	0	0	0	0	1	0	2	19	22
Indiana	25	10	0	15	51,922	568	438	0	0	0	6	6	11	0	0	112	123
Kentucky	17	8	1	8	26,968	407	303	1	0	0	2	3	9	0	0	27	36
Illinois	53	30	0	23	120,612	1,091	976	4	0	0	7	11	25	0	1	177	203
Michigan	27	14	0	‡13	62,406	440	334	3	0	0	6	9	18	0	1	147	166
Kansas	64	32	8	24	199,597	1,422	1,377	1	0	1	9	11	26	0	4	184	214
Neb., Mo., Iowa	0	0	0	0	0	14	2	0	0	0	0	0	0	0	0	10	10
Oklahoma	93	54	8	31	302,175	1,964	1,866	1	0	0	11	12	68	9	10	277	364
Texas	302	204	11	87	1,295,647	6,298	5,248	6	2	2	40	50	192	29	55	1,097	1,373
North Central (Dist. 7-B & 9)	101	52	2	†47	289,419	2,047	1,610	1	0	1	15	17	85	0	9	428	522
West (Dist. 7-C & 8)	101	88	2	11	457,929	1,505	1,418	0	0	0	8	8	26	0	2	124	152
Panhandle (Dist. 10)	13	13	0	0	39,518	495	274	0	0	0	0	0	1	0	0	2	3
Eastern (Dist. 5, 6, & 6-P)	12	8	0	4	62,093	327	236	2	1	0	4	7	3	2	3	68	76
Gulf Coast (Dist. 2 & 3)	44	24	4	16	283,637	934	849	2	1	1	10	14	42	21	27	191	281
Southwest (Dist. 1 & 4)	31	19	3	9	163,051	990	861	1	0	0	3	4	35	6	14	284	339
Louisiana	53	33	8	12	260,259	964	977	0	1	1	3	5	24	9	3	99	135
Northern	36	23	7	6	116,852	515	643	0	1	0	1	2	1	2	0	41	44
Southern	17	10	1	6	143,407	449	334	0	0	1	2	3	23	7	3	58	91
Arkansas	5	3	0	2	17,788	134	134	0	0	0	0	0	2	0	0	27	29
Mississippi	3	1	0	2	28,316	174	180	0	0	0	0	0	4	0	1	50	55
Southeastern States	0	0	0	0	0	23	22	0	0	0	0	0	1	0	0	20	21
Montana	2	0	0	2	6,432	101	116	0	0	0	1	1	1	0	1	12	14
Wyoming	10	8	0	2	34,793	280	208	0	0	0	2	2	12	0	0	51	63
Colorado-Utah	2	2	0	0	5,925	62	114	0	0	0	0	0	1	0	0	25	26
New Mexico	7	5	2	0	33,905	262	286	0	0	0	0	0	6	0	0	24	30
California	61	45	2	14	260,280	1,289	1,351	2	0	1	13	16	24	0	3	220	247
Total United States	773	465	54	254	2,810,339	17,560	16,831	19	3	5	100	127	426	47	87	2,585	3,145
Total previous week	757	404	47	306	2,591,698	16,787	16,128	15	2	2	126	145	407	44	82	2,485	3,018
Total June 26, 1948	753	429	51	273	2,506,461			13	1	3	96	113	371	35	130	2,216	2,752

Service wells included: *6, †1, ‡3.





DAILY AVERAGE PRODUCTION FOR WEEK

	June 25 crude oil	B. of M. June demand	June 18 crude oil
Alabama	1,250	1,550	1,200
Arkansas	72,650	86,000	72,550
California	919,000	940,000	921,700
Colorado	64,700	65,000	65,100
Eastern	58,000	60,850	58,500
Florida	1,300	1,400	1,400
Illinois	178,900	165,000	174,300
Indiana	25,000	23,000	23,200
Kansas	294,300	300,000	281,150
Kentucky	23,300	21,000	23,400
Louisiana	498,600	487,000	497,500
North Louisiana	108,600		107,500
South Louisiana	390,000		390,000
Michigan	41,400	46,000	41,750
Mississippi	97,500	114,000	96,250
Montana	27,700	24,000	27,900
Nebraska	500	700	400
New Mexico	137,900	126,000	137,900
Oklahoma	407,250	405,000	405,850
Texas	1,908,000	2,210,000	1,908,000
Dist. 1 (Southwest)	26,095		26,095
Dist. 2 (Southwest)	118,925		118,925
Dist. 4 (Southwest)	185,750		185,750
Dist. 3 (Gulf Coast)	354,430		355,430
Dist. 5 (Eastern)	34,350		34,350
Dist. 6 (Eastern)	83,250		83,250
East Texas field	242,600		242,600
Dist. 7-C (West)	42,150		42,150
Dist. 8 (West)	529,200		529,200
Dist. 7-B (W. Central)	59,975		59,975
Dist. 9 (N. Central)	137,275		137,275
Dist. 10 (Panhandle)	93,000		93,000
Utah	600	500	500
Wyoming	123,900	123,000	121,300
Total United States	*4,881,750	5,200,000	4,859,850
Change from previous week, up	21,900		

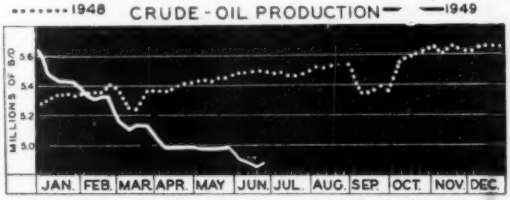
Total production January 1-June 25 †913,522,600 bbl.
Same period last year (crude plus cond.) 965,741,625 bbl.

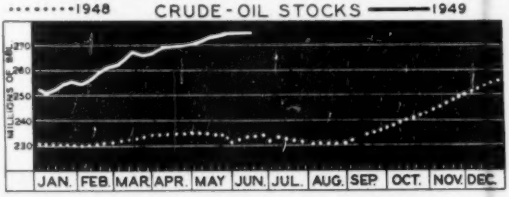
*Not incl. 78,440 bbl. condensate. †Incl. 14,773,440 bbl. condensate.

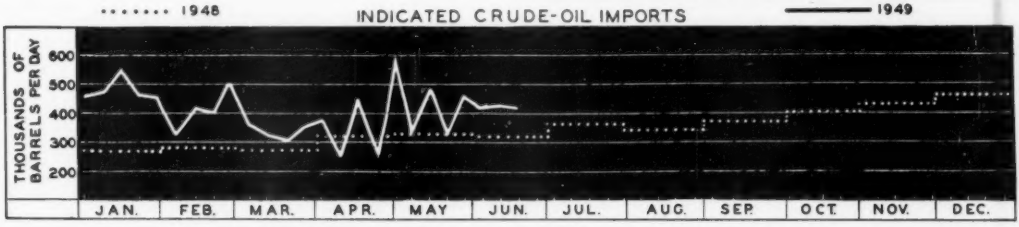
CRUDE STOCKS BY STATES OF ORIGIN

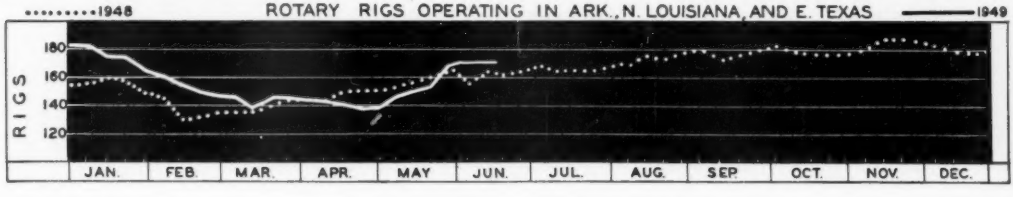
(Thousands of barrels)

State of origin—	June 18, 1949	June 11, 1949	June 19, 1948
Pennsylvania Grade	3,004	3,063	2,705
Other Appalachian	2,067	2,085	940
Ill., Ind., Mich.	14,391	14,275	10,721
Arkansas	3,002	3,031	2,714
Louisiana	14,980	14,992	11,341
North	3,339	3,227	2,951
Gulf	11,641	11,765	8,390
Mississippi	3,277	3,418	2,670
New Mexico	7,795	7,542	5,398
Oklahoma and Kansas	40,402	40,027	33,946
Texas	128,782	127,638	114,060
East Texas	17,934	17,750	16,642
West Texas	51,368	51,223	42,574
Texas Gulf	30,247	30,053	29,476
Other Texas	29,233	28,612	25,368
Rocky Mountain	14,233	14,326	9,064
California	34,877	35,297	30,256
Foreign	8,146	8,132	5,806
Total United States	274,956	273,826	229,621







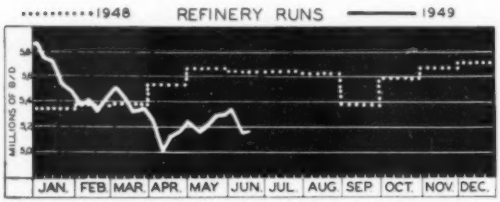


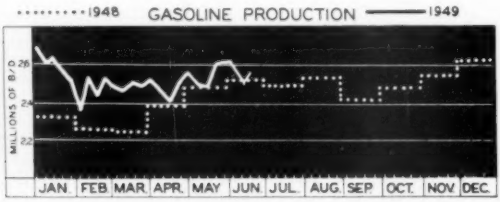
A.P.I. REFINERY REPORT, JUNE 18

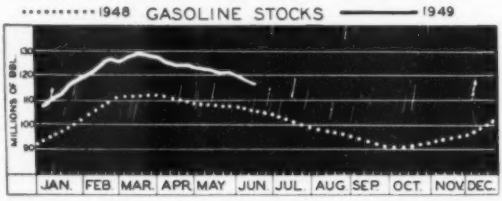
(Thousands of barrels)

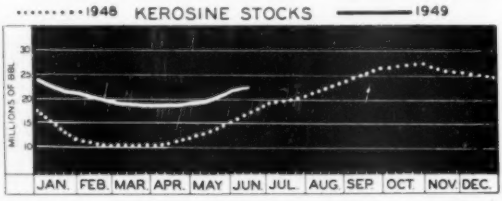
District—	Crude runs daily avg.	Daily average production: Gasoline*	Kerosine	Distillate	Residual	Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline†	Kerosine	Distillate	Residual	Bureau of Mines, June 1948: Daily avg. crude runs	Daily average production: Gasoline*	Kerosine	Distillate	Residual
East Coast	695	277.7	16.0	112.4	158.1	28,286	9,451	21,051	10,097	898	321.9	51.6	177.6	220.4
Appalachian:														
District 1	87	38.9	1.9	9.9	8.3	2,485	389	717	494	104	43.1	7.8	13.3	12.3
District 2	47	29.3	1.0	2.7	6.6	1,119	147	220	255	59	31.7	1.9	5.5	12.4
Ind., Ill., Ky.	864	501.7	45.4	100.4	131.3	25,734	3,828	9,412	5,433	894	481.3	53.5	117.7	152.7
Okla., Kans., Mo.	406	233.0	18.7	67.7	60.3	11,327	1,352	4,443	2,509	469	235.5	22.2	87.6	77.2
Inland Texas	195	138.0	11.6	18.9	40.3	4,570	553	744	1,121	248	152.8	14.4	25.3	58.6
Texas Gulf Coast	1,241	635.6	66.9	186.0	232.6	14,924	3,220	9,459	8,167	1,406	614.3	99.3	309.0	265.4
La. Gulf Coast	413	210.7	34.0	98.1	42.4	5,188	1,878	3,665	2,270	428	182.7	45.7	89.5	75.3
N. La. and Ark.	77	33.0	6.4	9.7	17.0	2,617	604	912	249	83	28.9	7.7	14.4	18.8
Rocky Mountain:														
New Mexico	11	6.1		1.7	3.1	67	25	73	33	12	6.1	0.5	1.6	3.3
Other Rocky Mtn.	178	79.1	5.4	27.3	34.4	3,284	290	1,392	980	154	65.9	3.9	25.2	30.3
California	957	388.0	11.3	112.0	364.6	16,802	767	9,357	33,986	877	364.5	4.3	131.0	352.9
June 18, 1949‡	5,171	2,571.1	218.6	746.8	1,099.0	116,403	22,504	61,445	65,594	5,632	2,528.7	312.8	997.7	1,279.6
June 11, 1949	5,153	2,520.1	231.0	815.9	1,186.4	117,484	22,006	60,402	65,901					

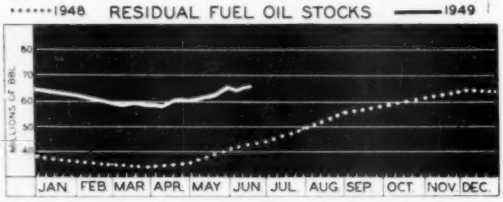
*At refineries including natural blended. †Finished and unfinished. ‡Comparable data for 1948 on new basis not available.

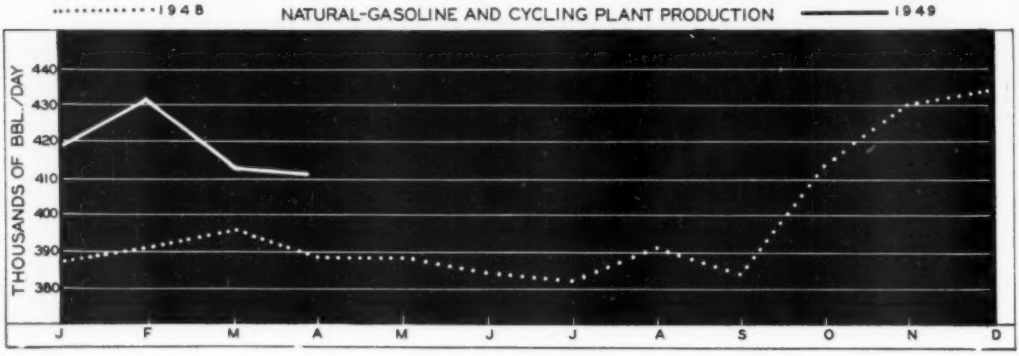












CRUDE PRICES
GRAVITY SCHEDULE

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.78			
19-19.9	1.85			
20-20.9	1.93	$2.25		$2.12
21-21.9	2.00	2.27		2.14
22-22.9	2.07	2.29		2.16
23-23.9	2.13	2.31		2.18
24-24.9	2.20	2.33	$2.56	2.20
25-25.9	2.26	2.35	2.58	2.22
26-26.9	2.31	2.37	2.60	2.24
27-27.9	2.37	2.39	2.62	2.26
28-28.9	2.42	2.41	2.64	2.28
29-29.9	2.48	2.43	2.66	2.30
30-30.9	2.54	2.45	2.68	2.32
31-31.9	2.59	2.47	2.70	2.34
32-32.9	2.64	2.49	2.72	2.36
33-33.9		2.51	2.74	2.38
34-34.9		2.53	2.76	2.40
35-35.9		2.55	2.78	2.42
36-36.9		2.57	2.80	2.44
37-37.9		2.59	2.82	2.46
38-38.9		2.61	2.84	2.48
39-39.9		2.63	2.86	2.50
40 and above		2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947. Above changes do not include recent reductions of a few buyers applying principally to low-gravity grades.

FLAT CRUDE PRICES

Representative posted schedules per barrel

East Texas†	$2.65
Kettleman Hills, California*	2.77
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.35
Bradford, Pennsylvania	3.40
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above

IT has been about a month since Esso Standard Oil Co. announced its policy designed to protect resellers of No. 2 fuel against price increases during the summer fillup season, and about 2 months since Standard offered the protection to household consumers. Other major suppliers have adopted somewhat similar plans but fuel oil for home heating is still for the most part in the tanks of primary suppliers.

In spite of decreased crude runs and very low refinery yields of distillate fuels, stocks climbed faster in the first 3 weeks of June than the average for June of last year. However, the increase for the week ended June 18 was much smaller than that of the other weeks and may be an indication that some of the normal summer movement has started. With reduced production, most refiners feel that stock increases in July cannot be as great as they were last year, when distillate inventories piled up at the rate of 329,000 bbl. daily.

Standard Oil Co. (Ind.) reduced its tank wagon price on kerosine, range oil, furnace oil, and diesel fuels by ½ cent per gallon effective June 21. This reduction covers sales to consumers in Standard's north-central marketing area.

Other plans by distillate marketers include special summer discounts on sales of furnace oils made before the end of July.

In the Mid-Continent area some distillate continues moving at prices less than normal market but these below-the-market prices are no lower than they were several weeks ago.

Gasoline demands are still running well above last year and suppliers are expecting another week of big stock reductions either just before or just after Independence Day.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of June 27, 1949. Figures are f.o.b. plant for tank-car shipment in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Tex. Gulf Coast
Regular gasoline, 73-75 octane	9⅝-9⅞	11.25-12	9½-10
Premium gasoline, 78-80 octane	10⅜-11	12.25-13	10½-11
42-44 w.w. kerosine	8-8½	8-8.4	7.50-8
No. 2 straw fuel oil	6¾-7	6.75-7.4	6⅜-6½
No. 6 residual	$0.85-0.90	$1.60	$1.20-1.25

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5½	5	5¼
Grade 18-55	6.6	6	6.3

LUBRICATING OILS
South Texas

200 vis., No. 2-3 neutral	11
750 vis., No. 3-4 neutral	14
2,000 No. 5-6 neutral	16-16.5

LUBRICATING OILS
Mid-Continent

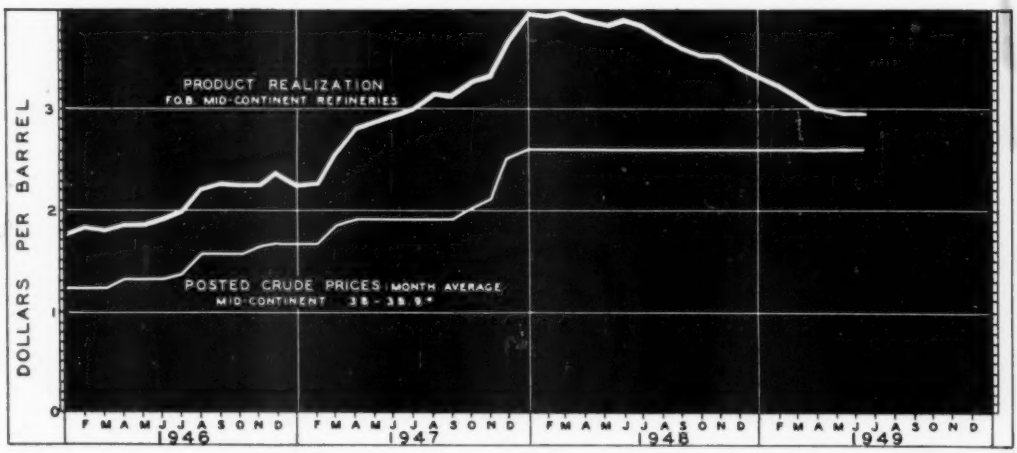
150-160 vis., D bright stock, 0-10 pp.	19
200 vis., No. 3 neutral, 0-10 pp.	12-14

Western Pennsylvania

144-155 vis., 10 p.t. bright stock	19.5
180 vis., 0 p.t. neutral	20.5

CRUDE-SCALE WAX
Mid-Continent

132-134 A.M.P.	4.75



In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil

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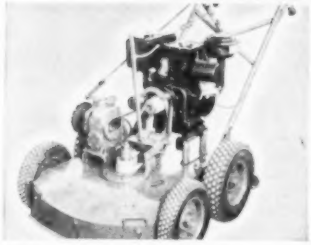
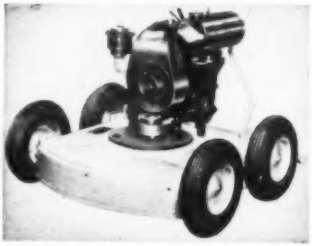


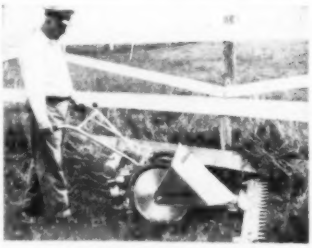
WHIRLWIND "SP"

. . . 24-inch self-propelled rotary-scythe mower grooms fine lawns . . . wades easily through tall weeds and tangled vegetation. 4 h.p. Briggs & Stratton engine. Welded, heavy plate steel construction. Equipped with 16 precision ball or roller bearing units.



WHIRLWIND "JUNIOR"

. . . 20-inch rotary-scythe mower . . . self and hand-propelled models. Patented suction action lifts growth for level cut, chops clippings to fine mulch. Removable blade sharpens in a jiffy. Easy to operate . . . dependable . . . economical.



TORO "ZIPPER"

. . . 36-inch power sickle for cutting around tank farms and oil fields. Replaces five men with hand scythes. Balanced for easy handling on rough ground, side slopes and close to obstacles. Simple to transport. Equipped with 1½ h.p. engine.

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WYTEFACE "A" Steel Tapes have raised black graduations on a crack-proof white surface. Easy to read in any light, from any angle. Designed for hard service. Resist rust and corrosion. Raised rims and markings protect the white background from abrasion from rails, pipe, rocks, concrete. Made in styles especially for Oil Riggers, Oil Gaugers and for general measurements. See your supply house, or write for details to Keuffel & Esser Co., Hoboken, New Jersey.

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EQUIPMENT MEN . . . in the News

Universal Names Tudor as Sales Promotion Manager

Universal Petroleum Co., has announced the appointment of R. M. (Bob) Tudor as sales - promotion manager. Tudor has been identified with L.P.G. and natural - gas business for many years. After leaving Oklahoma University he was employed by Oklahoma Natural Gas Co. as inventory engineer, and later with Skelly Oil Co.'s engineering department in the Texas Panhandle. More recently, he served with Southern Gas and Equipment Co. as sales engineer covering the Midwest and Southeast territory.

Universal also announced the addition of another department to be known as the Uniquip division which, as the name suggests, will supply L.P.G. distributors with special items of equipment, technical advice, and operation planning.

McDannold Assigned to Oklahoma Area

George McDannold, Vinson Supply Co. engineer, has been assigned to the Oklahoma City and Western Oklahoma area, with offices in Oklahoma City. A graduate petroleum engineer from University of Oklahoma, McDannold spent 3 years with Carter Oil Co. in Oklahoma and Illinois as a reservoir engineer.

A specialist in automatic control problems, he has attended the factory school of Fisher Governor Co. McDannold brings a year and a half of concentrated experience in Fisher control equipment and the other Vinson Supply lines to his new assignment.

Reilly and Shuman Travel For Fluid Packed Pump

J. B. Reilly, owner, and Sidney Shuman, general sales manager for Fluid Packed Pump Co., are both engaged on extensive trips in behalf of their company.

J. B. REILLY

Reilly is in Scotland now and his trip will carry him to Norway, Sweden, Denmark, Belgium, France, Switzerland, Ireland, and England. On this trip, Reilly is combining business with some sightseeing.

S. SHUMAN

Shuman's trip took him first to Tulsa, where he was accompanied by his assistant, John Brennan, to assist in conducting the company's Mid-Continent sales meeting. From Tulsa, Shuman went to Toledo for discussions with National Supply Co. executives, and on to New York for a conference with National Supply Export Corp. officials. From there he flew to Caracas for another meeting with National Supply Export Corp. representatives.

His schedule calls for intensive coverage of Venezuela and Trinidad fields, and a stopover in Mexico City before he returns to California about August 1.

Cooper, Inc., Holds Annual Sales and Service Meeting

J. W. ALLEN

A 4-day sales and service meeting has just been concluded at the Tulsa plant of Fred E. Cooper, Inc. A number of new spudders and draw-works units were inspected and demonstrated. Besides the Cooper force, engineers from several suppliers led technical discussion on new equipment and uses.

At the conclusion of the meeting, the board of directors of Fred E. Cooper, Inc., announced the appointment of J. W. Allen as general manager of the company. The board also has accepted the resignation of Harold E. Cooper as an officer of the company.

Allen formerly was vice president in charge of engineering and manufacturing of Cooper-Allis-Chalmers well servicing equipment, draw works, spudders, and power units. He has been associated with the Cooper organization for more than 20 years, and takes to his new position a thorough knowledge of all phases of the business and a wide acquaintance in the oil industry throughout the world.

Representatives of Fred E. Cooper, Inc., attending 4-day sales and service meeting in Tulsa

Oilwell Announces Changes In Canadian District

Appointments of two store managers and two district representatives in the Canadian district have been announced by R. L. Armstrong, Rocky Mountain division manager for Oil Well Supply Co. K. J. Miller has been named manager of the Edmonton, Alta., store and is succeeded as manager of the Okotoks, Alta., store by W. S. Palmer. O. O. Beasley and George F. Carraher have been named district representatives with headquarters at Edmonton and Calgary, respectively.

Both Miller and Palmer are Canadian citizens. Miller, a native of Okotoks, has been store manager

there since 1947. Palmer has served as warehouseman in the Okotoks store since joining Oilwell in 1947. Beasley has more than 18 years' service with Oilwell and has been manager of numerous stores in Texas, New Mexico, and Louisiana.

Carraher was district representative at Houston and an export representative in Oilwell's export division at New York City before taking his newest post.

Harcus Made Manager of International Cementers

E. S. Dulin, president of Byron Jackson Co., has announced the appointment of Robert Harcus as general manager of International Cementers, Inc. Harcus, who succeeds John Chesnut, has been with Byron Jackson since 1945, and active in the development and application of shaped charges in the oil industry.

ROBERT HARCUS

F. D. SMITH

Before joining Byron Jackson Co., he was in Burma and India for 23 years with Burmah Oil Co., Ltd., as field superintendent and manager of prospecting operations.

At the same time the following new appointments were announced by International Cementers, Inc.: Frank D. Smith as assistant general manager, formerly California division manager; Robert D. Fagan as California division sales manager, previously assistant California diviston sales manager; Jack Smith, as manager of foreign sales.

National Supply Co. of Venezuela Is Formed

Formation of National Supply Co. of Venezuela C.A., with headquarters in Caracas, has been announced by National Supply Export Corp. The new subsidiary of National Supply Co. will represent Venezuelan interests of the company as well as those of its British associate, Oil Well Engineering Co., Ltd., of England.

T. B. Herndon has been named manager of the subsidiary, the principal function of which will be the distribution of oil-well machinery and equipment. Herndon has been associated with National Supply since 1936 as field engineer, specializing in machinery and equipment sales. Early this year he was appointed division manager in Caracas.

Fafnir's New Dallas Office and Warehouse

Fafnir Bearing Co. has recently purchased and occupied this building on Elm Street in Dallas for office space and warehouse facilities. The new location enables Fafnir to carry a much larger stock of ball bearings. Wilson S. Shirley is Fafnir's Dallas manager

Taylor to Manage Refinery Sales for Bethlehem

W. F. TAYLOR

I. C. Smith, general manager of sales of Bethlehem Supply Co., announces the promotion of W. F. (Frank) Taylor to manager of refinery sales. He succeeds T. B. Leech, who is resigning to join Petro-Chem Development Co.

Taylor has had over 22 years in the oil and supply industries. He spent 10 years with Indian Territory Illuminating Oil Co., where he received both field and office experience. He joined the Bethlehem organization in 1936 and has served in various departments since that time.

Concurrent with this change, Smith also announces the transfer of R. M. Berman from Corpus Christi to Tulsa to handle the sale of Petro-Chem Iso-Flow heaters, super heaters, and boilers under the direction of Taylor. Berman received his degree in chemical engineering at Texas University in 1938, after which he spent 10 years with Hercules Powder Co. in engineering and supervisory capacities. He joined Bethlehem in 1948.

R. M. BERMAN

L. A. MYERS

Luther A. Meyers is taking over the former duties of Taylor. Myers has had a long and varied experience in the supply business, having first started in 1926. He served several years with Murray Brooks, Inc., and was sales manager for them prior to entering military service. He will headquarter at Tulsa.

McGee Made Products Development Engineer

J. K. McGEE

John K. McGee, Carnegie Institute of Technology graduate, has been named product development engineer for Texas Electric Steel Casting Co., Houston, Thomas H. Shartle, Tesco president, announced this week.

Immediately after his graduation, McGee entered the Army Air Forces as an engineering officer. In 1943, he went to Manchester, England, where he helped establish and was later one of the officers in charge of the Army Air Forces' largest aircraft replacement parts depot in England.

Meek to Represent Beaird In Tulsa Territory

J. R. MEEK

J. Robert Meek of Tulsa has been appointed sales representative for J. B. Beaird Co. of Shreveport, according to an announcement by John L. Tullis, manager of sales.

Meek will be sales representative in the Tulsa area where he will handle the sales of Beaird packaged compressor plants, refinery process vessels, pressure-storage equipment, refinery fittings, and other Beaird products. For the past 16 years Meek has been with Happy Co. of Tulsa as sales and development engineer.

Classified Advertising

The Market Place for the Oil Industry

UNDISPLAYED

All ads, 12 cents a word. Minimum charge, $3.00 per insertion.
Centered Line, any ad, $1.00.
Box Numbers count 9 words when replies are to be sent to our Tulsa Office. Replies forwarded without charge.

DISPLAYED, PER INCH

$12.00 per column inch per insertion. One-point border and 12-point capitals are allowed. Larger type sizes not accepted.

All classified advertising payable in advance.
10% Discount if 3 insertions are ordered at one time.
COPY DEADLINE, 9:00 a.m. Monday prior to each week's issue.

THE OIL AND GAS JOURNAL
P. O. Box 1260, TULSA, OKLAHOMA

EQUIPMENT FOR SALE

ONE Army surplus Buda M. O. 893, six cylinder engine with skid complete, $1,750.00 F.O.B. Houston. W. H. Orr, A 8-6064; 2215 Japhet Street, Houston 10, Texas.

FULLY equipped seismic recording unit, 12 traces, modern automatic amplifiers, Koenig built body. Shooting unit complete, good condition. For bargain write Box C-959, The Oil and Gas Journal, Tulsa, Oklahoma.

ROTARY-RIG mounted on Dodge Truck; derrick folds back, ball-bearing crown, swivel, block, rotary. Mission equipped mud-hog, 2⅞ drill. Strong and compact. Money maker for Reverse Circulation, Deep Water Wells, Oil Wells 2500 feet. Address Box 106, Seminole, Oklahoma.

FOR SALE: Used storage tanks in good condition. Capacities of 50,000, 60,000, or 80,000 bbls. dismantled present locations Oklahoma and Texas, or erected on your locations at attractive prices. Also offer new tanks any capacity for prompt shipment and erection. ATLAS TANK AND STEEL CO., TULSA, OKLA.

TANKS—TANK CARS
NEW LOW PRICES

2—74,000 Bbl. Steel Tanks, Like New
2—10,000, 3—1,000 and 3—65 Bbl. API New Bolted Tanks
80—8,000 and 10,000 Gal. Cap. Tank Cars

THE DARIEN CORPORATION
60 E. 42nd St. New York 17, N. Y.

NEW
FRACTIONATING TOWER
REFLUX DRUM

One (1) New fractionating tower, 5'-0" I.D. X 89'-6" over-all height X 1⅛" plate. Thirty-four (34) bubble trays, ten (10) 18"-300# manways. Stress relieved and built in accordance with API-ASME Code for 350 PSI working pressure.

One (1) new horizontal reflux drum, 5'-6" I.D. x 18'-6" over-all length x 1⅛" plate. Stress relieved and built in accordance with API-ASME Code for 350 PSI working pressure.

ROCK ISLAND OIL & REFINING CO., INC.
335 West Lewis St. Wichita, Kansas
Phone 7-3325

EQUIPMENT FOR SALE

FOR SALE: Model "K" Cardwell, single drum draw works powered by G.A.K. Waukesha engine. Equipped with 98' "A" mast and sub skid. Priced for quick sale. Terms. Melton Supply Co., Seminole, Okla.

ROTARY equipment, almost new, only used few days, 1800' PK rods, Drill collar 30'x4¼" with 3½" box, King water swivel 1¼", PK slips, hoisting plugs, overshot. Complete outfit $4500, or will divide. We handle new and used spudders, rotaries, core drills, pipe, tools, cable. Fishing tools and equipment rented. Pressey & Son, Pueblo, Colo.

FOR SALE: Near Blackwell, 1 Standard Cable Tool Drilling in-Clean out unit on steel skid base, complete, less tools. $1,000. Cities Service Oil Co., H. D. Patridge, Bartlesville, Oklahoma.

OIL WELL CASING: Have good used lapweld, 7" and 8" sizes. C. M. BARRINGTON, Phone 4915, Coleman, Texas. Box 831.

SULLIVAN 22 Core Drill. Also truck mounted cable tool rig. Both only slightly used. Excellent condition throughout. R. B. McElwaine, Box 127, Little Rock, Ark.

CASING, A-1 used lapweld, T C.V threads, 5½, 13 lb. 60c; 7 in. OD. 17 lb., 70c; same size 20 lb. 82c; 8⅝, 24 lb., $1.28; tubing, 2⅜, 4.50 wt. T C, 11½ V thread, regular or upset, 22c, subject inspection, on cars central West Va. Two only 165 HP Waukesha drilling motors, gas-gasoline, like new, $2750. 25 strings cable tools, bits, bailers, fishing tools, rigs, drilling machines. H. P. McGinnis, Box 827, Parkersburg, West Va.

EQUIPMENT FOR SALE

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

SAVE WITH SAFETY—Very Good Used Wire Line—Any Size or Length up to 5,000' —Respooled for Your Inspection — Cable Tools for Sale. General Tool & Supply Co., P.O. Box 4387, Phone 61335, Oklahoma City, Okla.

FOR SALE: 10,000 ft. 20" OD x ¼" Wall New Electric Weld Steel Pipe, Double Random Lengths; 50,000 ft. 18" OD x ¼" Wall Used Steel Pipe, Single Random Lengths. Utility & Industrial Supply Company, 921 Michigan Ave., E., Jackson, Michigan.

USED 2-Drum CARDWELL MOBILHOIST, $7800.00. Can be used as well service winch; also with cable tools; also has rotary drive sprocket. R. F. HARE, Box 175, Phone 223, Ozona, Texas.

COMPRESSOR BARGAIN: 14" and 16" Ingersoll Rand and Worthington Duplexes. All in excellent mechanical condition. 5½" to 16" bore cylinders available. Traders Oil Company of Houston, 821 Esperson Building, Houston 2, Texas.

FOR SALE: Wilson Super Spudder—Double drum, double pole mast, complete with walk ways, roof, wings, and fully skidded—Good Wire—Priced to sell. Wilson Mogul Drawworks, powered by 145 GK Waukesha—Portable derrick—Wilson Snyder 6 x 16 pump, powered by WAK Waukesha—4½" Drill Pipe, Traveling Block, Swivel, 4¼" x 40' Kelly, BJ Tongs, etc.—Priced to sell. Write: T & R Oil Field Machine & Supply Co., Box 98, Carmi, Ill.

PACKAGED H_2S REMOVAL UNITS

We offer prompt shipment on skid-mounted hydrogen sulfide removal units for treating sour gas for pipe line or fuel gas purposes.

GRAFF ENGINEERING & EQ'PT. CO.
3415 Westminster, Dallas 5, Texas

FOR SALE

Practically New Bethlehem S-40 Pulling Unit complete with all equipment, powered with 145-GKU Waukesha Engine—Bargain.

C. L. McMAHON, INC.
1605 National Bank of Tulsa Bldg.
Tulsa, Oklahoma

STEEL STORAGE TANKS

Railroad Tank Car Tanks
6,500 to 12,000-Gal. Cap.
Coiled and Non-Coiled
Cleaned—Painted—Tested
Heavier—Safer—Cheaper
Other Tanks Too
Also—Complete Tank Cars
8,000 and 10,000-Gal. Cap.

Your Inquiries Solicited

NEWHALL-MARSHALL-WOOD, INC.
30 Church Street, New York 7, N. Y.
Phone: COrtlandt 7-8090

MODERN 7,500' RIG

FACTORY REBUILT WILSON "GIANT" DRAW WORKS
Powered By
THREE RECONDITIONED Le ROI ENGINES

Draw Works torn down, to bare skid, rebuilt to low streamlined silhouette, with greatly simplified controls. All worn bearings, clutches, chains, sprockets, etc., replaced. 500 hp. transmission. New hydromatic brake.

Balance of rig consists of 7¾-in x 18-in. pump and proper size units of popular makes.

You will, indeed, be pleasantly surprised at the reasonable price and terms at which this complete rig is offered. Inquire for details.

LUCEY PRODUCTS CORPORATION
OIL WELL SUPPLIES
TULSA, OKLAHOMA

EQUIPMENT FOR SALE

FOR SALE: New 6-WAKU Waukesha motor complete. Twin Disc clutch, gas-gasoline carburetor. Never out of warehouse. $1,200 under list. $3,750 FOB Odessa. ARROW SUPPLY COMPANY, Odessa, Tex.

FOR SALE: 83-Speed Star all steel drilling machine, mounted on steel skids; and "tailing-in" and "cleaning-out" tools. Price $6000. Mrs. Mary Bliss, telephone 59, Box 338, St. Elmo, Illinois.

FOR SALE: Sullivan Rotary Drill Model "N" Trailer mounted, 50 h.p. Buda power, 1900 feet P.K. Rod, Gaso. 4/10 mud pump 33 h.p. motor, many bits, heads, tools, $5000. Ben Sherman, Phone 243, Deming, N. M.

Several Army Surplus 4½" x 6" Gaso Duplex 1860 Pumps—two piece skid mounted with Chrysler 8 cylinder engines. Will sell pumps only or complete units about half price.

H. H. COFFIELD
ATTN: W. H. Orr
Phones: 132—Rockdale, Texas
A-86064—Houston, Texas

NEW

A.P.I. CASING COUPLINGS

1,441—5½" O.D., 8 R. T. Long N-80
791—5½" O.D., 8 R.T. Short J-55
79—6⅝" O.D., 8 R.T. Long J-55
100—7" O.D., 8 R. T. Long J-55
144—7" O.D., 10-V Long J-55
15—8⅝" O.D., 8 R.T. Long J-55

ROCK ISLAND OIL & REFINING CO., INC.
335 West Lewis Street
Wichita, Kansas Telephone 7-3325

LIQUIDATING GASOLINE PLANT
SHIDLER, OKLAHOMA
WILL QUOTE ATTRACTIVE PRICES!

Truscon Steel Buildings

Complete with structural Steel Framing, galvanized steel panels, steel windows and doors. Suitable for re-erection.

1—60-ft. x 186-ft. x 10-ft.
1—24-ft. x 36-ft. x 10-ft.
1—32-ft. x 30-ft. x 10-ft.
1—42-ft. x 20-ft. x 12-ft.
1—36-ft. x 44-ft. x 10-ft.

Pressure Vessels

1—Still, 6'0" x 35'0" x 1" shell, 200-lb. W.P. with steam coil.
7—Pressure Storage Tanks, 10'0" x 30'0" x ½" shell; 18,000-gallon capacity.
5—Pressure Storage Tanks, 7'0" x 30'0" x 7/16" shell; 8,800-gallon capacity.
9—Scrubber Tanks, 3'6" x 10'0" x ⅜" shell.
2—Scrubber Tanks, 2'6" x 10'0" x 3/8" shell.
1—Storage Tank, 24'0" x 20'0" x 3/16" shell; 64,000-gallon capacity; riveted construction; open top.

Centrifugal and Reciprocating Pumps and Compressors — Pipe —Valves and Fittings

Write for complete list and quotations

Equipment may be inspected on the Gulf Jessie McComb lease, 1 mile west of Webb City, Oklahoma.

BROWN-STRAUSS CORP.
P.O. Box 78 Phone: L.D. 169
Kansas City 10, Mo.

EQUIPMENT FOR SALE

COMPLETE GENERATING PLANT
Two NT 128-BHP vertical natural gas engines and one 48-BHP, driving two GE 75-KW, 3-phase, 4-wire 120/208 volt, 60-cycle generators and one 30-KW, 3-phase generator respectively. Complete with switchboards and auxiliary equipment. Running and in good condition. Public Market, 311 So. Klein, Okla. City, Okla.

FOR SALE: Wilson Giant draw works, powered by 2—J.L.-1335 Buda engines and Wilson chain compound. Like new condition, with bargain price. Terms. Melton Supply Co., Seminole, Okla.

EQUIPMENT FOR SALE

1—Worthington horizontal duplex reciprocating pump, enclosed frame, outside end packed plungers, forged steel fluid end, water cooled stuffing boxes, stainless steel valves and seats, size 10x3x10. 1—Clark engine and compressor, engine 80 H.P., size 16" x 15" x 7¼" x 20", 200 R.P.M., compressor intake pressure 0 lbs. discharge pressure 350 lbs., type Q compressor cylinders. 1—Worthington 4" x 18", 4-6 chrome block, horizontal, duplex, double plunger, enclosed frame hot oil fitted power pump, driven by Worthington 12½" x 14" horizontal, double acting steam engine with some spare parts for engine. 1—Worthington 5¼" x 18", 4-6 chrome block, horizontal, duplex, double plunger, enclosed frame, hot oil fitted power pump with some spare parts, driven by Worthington 12½" x 14" horizontal, double acting steam engine with some spare parts. Equipment second hand, in good condition; spare parts new. American Liberty Oil Company, Mt. Pleasant, Texas.

For Sale: Copyright 72601
THE ELECTRIC OIL HEATING UNIT
Heats oil to 222 Degrees
CLAUDE RAY JOHNSON
Willoughby Hotel Guymon, Oklahoma

MANUFACTURERS LATEST DESIGN

Hydraulic Casing Pulling Units. Complete line of equipment. Units made to your specifications. Truck Mountings or Skid Units. Repair Service and Parts.

OKLAHOMA MACHINE & SUPPLY CO.
Ada, Oklahoma

NEW 6⅝" O.D. API LINE PIPE

Seventy-three (73) Miles New 6⅝" O.D. 13# API Electric Weld Line Pipe, Plain End, Beveled for Welding, Regular Mill Coating, double random length Van Dyke Protectors Applied. Rock Island Oil & Refining Co., Inc., 335 West Lewis Street, Wichita, Kans. Telephone 7-3325.

FOR SALE

12—230 H.P. Type 10 Bessemer New 17" Power Cylinders complete ready to run with 16" to 18" Compressors. 1—230 H.P. Clark Horizontal with Compressors. Located Salem, Illinois.

ENGLE PETROLEUM, Incorporated
Box 655, Evansville, Indiana

COMBINED VAPOR SEPARATOR AND FRACTIONATOR FOR THERMAL REFORMING

One (1) New 5'-6" I.D. X 61'-0" overall height Bubble Tower made of 1¼" thick, 11-13% chrome Stainless Steel, type #405. Stainless Steel Support Plates in place for fifteen (15) trays, (trays not included). Constructed in accordance with the API-ASME Code, Stress relieved and radiographed. Designed for 400 PSI @ 750° F. Fabricated by A. O. Smith Corporation. Platform and Ladder Clips installed.

WOOD RIVER OIL & REFINING COMPANY, INC.
335 West Lewis Street
Wichita, Kansas Telephone 7-3325

EQUIPMENT FOR SALE

FOR SALE: 7400' 7" OD 20# used 10 V-Thread Lapweld Casing near Electra and Vernon, Texas. 1600' DITTO, near Walters, Oklahoma. 95 cents per foot. 2700' 24# DITTO $1.20 per foot, near Walters, Oklahoma. Cities Service Oil Company, Patridge, Bartelsville, Oklahoma.

ONE used Ruska Vertical, compensated, ten gamma sensitivity Magnetometer, box, tools, auxiliary magnets, tripod, compass, leather cases. Normal wear outside, excellent inside. Guaranteed performance. William Booth, 619 Truxtun, Bakersfield, California.

FOR SALE at Oil Hill, Kansas: 2—80 HP Reeves 4 cylinder vertical gas engines, 9½" x 11", 300 RPM, Mfg. #8036-7. Empire Pipeline Co., Patridge, Bartlesville, Okla.

FOR SALE: One National Shot Hole Drill, solid kelly, Gardner-Denver pump, now working in West Texas. Also 500 gal. Dodge water truck. Box C-968, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE at Oil Hill, Kansas: 2—6" x 10" Worthington Deane Vertical Single Acting Triplex Used Pumps. Fig. No. 1654, Mfg. No. D88396 and 88400, maximum working pressure 425#, capacity 5270 BPD at 42 RPM. Empire Pipeline Co., H. D. Patridge, Bartlesville, Oklahoma.

FOR SALE: Rotary Mast Pole. 1—8" x 10" x 87' Two Leg Mast Pole with 5—24" Roller bearing sheaves in crown. 98'—¾" Raising Line and 110'—½" Telescope line. 1200'—9/16" Guywires and 160'—⅞" Guywire. 1—4000' Double Board. 1—30' Main Skid with upright supports for Mast and well for Rotary table. Denman Drilling Company, Phone 4553, Wichita Falls, Texas.

FOR SALE: One right-handed old style 40 hp. Reid gas engine cylinder. 410 Atlas Life Building, Phone 4-1569, Tulsa, Okla.

FOR SALE: 1 Model "K" Cardwell spudding unit powered by D-8800 Caterpillar Diesel motor, 1500 watt covered Kohler light plant on skids. Folding steel flaps for roof and walks, and canvas for inclosure. All steel dog house. Stems, bits, and bailers for 7-in. and 5-in. hole. Rod, tubing, and hand tools. Everything complete for immediate use. Shamrock Drilling Company, Great Bend, Kansas, Phone 3732, P.O. Box 322.

NATIONAL "50" Compound Double Drum Rig 125' Cantilever Ideco Mast, 10' substructure, 6,600' 1½" drill pipe, this rig complete and in excellent condition. P.O. Box 305 Sta. B, Bakersfield, California.

FOR SALE—One hydraulic casing pulling machine, good condition, complete in every detail. Box C-975, The Oil and Gas Journal, Tulsa, Oklahoma.

EQUIPMENT WANTED

WANTED Franks used well servicing. Advise description, location and price. Box C-972, The Oil and Gas Journal, Tulsa, Okla.

WANTED: 4 single well pumping units for 4,500' wells. Box C-974, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

ENGINEERING

During the next several months we will increase our Engineering Organization engaged in the design of Oil Refinery Plants and Power Plants. Location Cleveland, Ohio. The men we need should be qualified as draftsmen, designers, checkers or in higher engineering skills on design of piping, instrumentation, pressure vessels, structural steel, concrete, mechanical or electrical. For presenting your qualifications and prompt consideration, write to us for application form.

ARTHUR G. McKEE & CO.
2300 Chester Ave., Cleveland 1, Ohio

HELP WANTED

ENGINEERS, Executives, Technical Men Salaried positions—$3600 to $30,000. This confidential service for outstanding men who desire a change of connection, will develop and conduct preliminary negotiations without risk to present position. Send name and address for details. Tomsett Associates, 1204 Berger Bldg., Pittsburgh 19, Pa.

PRODUCTION ACCOUNTANT: Midwest independent has position open for man under 45 experienced in accounting for oil field operations, including drilling, production, taxes. Locate Kansas City. In replying, give full qualifications and salary expected. Replies held confidential. Box C-960, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Graduate engineer for supervisory work in pipe line construction, operation and maintenance. Location — Texas Gulf Coast. Prefer M.E., P.E. or C.E., 25 to 30 years old with three years experience or more in pipe line or related oil field work. In replying give full details including education, experience, references and personal details. Box C-958, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED—Independent company desires experienced engineer to supervise secondary recovery work consisting of waterflooding, gas injection and pressure maintenance projects. Experience in one or more phases of the above desirable but education, training and general production experience will carry considerable weight in selection. Location Tulsa. In replying give full details of personal, education and business history, references and salary expected. All replies will be kept confidential. Box C-971 The Oil and Gas Journal, Tulsa, Oklahoma.

NEW foreign and domestic Oil Employment Directory. Over 500 listings in drilling, production, refining, natural gasoline, pipelines, geological, exploration, supplies, manufacturers, services; and trucking, refinery and pipeline contractors, showing where to apply for jobs. Price $5.00. Oil Industry Mailing List, Box 2603, Tulsa, Okla. (Our 29th Year).

WANTED

An experienced oil field construction engineer for executive position in Venezuela. Good salary and living conditions. Reply P.O. Box 490, Tulsa, Okla.

WANTED

MECHANICAL ENGINEER

Experienced in design of pumping units and well head equipment. Excellent opportunity for right man to become Chief Engineer for well established company.

State age, qualifications, experience. Address:

BOX C-967

THE OIL AND GAS JOURNAL

TULSA, OKLAHOMA

LUBRICATING SALES ENGINEER

Permanent position as Assistant Manager—Lube Oil Sales in Northern California with major oil company. Position requires technical engineering education, successful industrial oil sales experience and marked ability in administrative work and the training of field salesmen. Prefer man 40 to 47 years of age. Good promotional possibilities after a reasonable period of service. For consideration write full details of background, education and experience first letter to Box C-973, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

SALES Engineer or District Representative. Experience selling oil and chemical companies tank fittings, gas regulators and fire protective devices. Prefer vicinity Chicago. Age 36, married. Box C-976, The Oil and Gas Journal, Tulsa, Oklahoma.

INSTRUMENT ENGINEER—Thirteen years supervisory, engineering, and maintenance experience in petroleum refinery and chemical plants. Box C-977, The Oil and Gas Journal, Tulsa, Oklahoma.

MAN with several years oil refinery experience desires similar position with independent refinery. Box C-953, The Oil and Gas Journal, Tulsa, Oklahoma.

MAN with several years oil refinery management experience desires position as district sales representative for refinery supplies. Box C-955, The Oil and Gas Journal, Tulsa, Oklahoma.

CANADIAN MANAGER AVAILABLE
Graduate Geologist and Petroleum Engineer, three years experience as manager production, Geology, Land and Natural Gasoline Plant western Canada; three years manager for major company Illinois and West Texas. Details and references upon request. Available 30 days. Box C-969, The Oil and Gas Journal, Tulsa, Oklahoma.

YOUNG married man with pre-war B.S. degree in business and engineering from M.I.T., several years experience in finance and selling, also fully rated commercial pilot (including instrument) desires connection with independent oil operator in useful capacity with object of learning producing end of oil business. Box C-966, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST: Eighteen years experience with major company, desires position with independent concern. Box C-970, The Oil and Gas Journal, Tulsa, Oklahoma.

MECHANICAL ENGINEER, age 37, married, 15 years experience on gasoline and chemical plant design and construction. Field engineering, write progress reports with pictures. Handle customer relations in field or project engineer in home office. Desire permanent employment with advancement possibilities. Box C-965, The Oil and Gas Journal, Tulsa, Oklahoma.

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Cost of Synthetic Liquid Fuels Continues to Drop

Cost of producing synthetic liquid fuels has dropped to the point where refined products, including gasoline, diesel oil, and heating oil, can now be made from coal and oil shale for as little as 8.4 to 12 cents per gallon, W. C. Schroeder, chief of the Office of Synthetic Liquid Fuels, U. S. Bureau of Mines, announced last week at the semiannual meeting of the American Society of Mechanical Engineers in San Francisco.

Schroeder said intensive investigation carried out in recent years by industry and the Government has made these low production costs possible, and excluding profit and interest of plant investment, he estimated that gasoline can be produced from coal at costs ranging from 9 to 12 cents per gallon. The plant investment would be between $7,000 and $8,500 for each barrel of capacity per day for plants of 10,000 bbl. capacity and over, Schroeder said.

Cost of crude shale oil, again excluding interest on investment and profit, is approximately $2 per barrel, and from this he estimated that cost of gasoline, diesel oil, and heating oil made from the crude shale oil would be about 8.4 cents per gallon. Initial plant investment would be between $4,000 and $5,000 per barrel per day capacity, he estimated.

"Developments in mechanized mining have shown that an astounding output per man is possible and that mining costs will be substantially less than 60 cents per ton of shale. In recent 30-day tests that output has exceeded 100 tons per man day underground," Schroeder continued.

Progress in refining oil shale also has been substantial and indicates that 75 to 85 per cent of crude shale oil can be converted economically into gasoline, heating oil, and diesel fuels, he said. Retorting of oil shale, while essentially a simple heating process, still needs considerable study to determine the most efficient equipment, Schroeder said.

CALENDAR

August

United Nations Scientific Conference on the Conservation and Utilization of Resources, U. N. Interim Headquarters, Lake Success, N. Y., August 17-September 6.

September

Interstate Oil Compact Commission, summer quarterly meeting, Stanley Hotel, Estes Park, Colo., September 1-3.

Instrument Society of America, annual meeting and exhibit, Municipal Auditorium, St. Louis, September 12-16.

National Petroleum Association, Hotel Traymore, Atlantic City, N. J., September 14-16.

American Gas Association, annual convention, Chicago, September 17-20.

American Institute of Chemical Engineers, Mt. Royal Hotel, Montreal, September 18-20.

American Association of Oilwell Drilling Contractors, ninth annual meeting, Baker Hotel, Dallas, September 19-21.

National Butane-Propane Association, Jefferson Hotel, St. Louis, September 19-21.

Mid-Continent Oil and Gas Association, twenty-seventh annual convention, Louisiana-Arkansas division Roosevelt Hotel, New Orleans, September 22-23.

American Institute of Mining and Metallurgical Engineers, regional meeting, Neil House, Columbus, Ohio, September 25-28.

American Society of Mechanical Engineers, fall meeting, Erie, Pa., September 28-30.

October

American Society of Mechanical Engineers, petroleum division, 1949 Petroleum Mechanical Engineering Conference, Biltmore Hotel, Oklahoma City, October 2-5.

National Association of Corrosion Engineers, South-Central Regional Division, annual meeting, Adolphus Hotel, Dallas, October 3-4.

National Lubrication Grease Institute, Hotel Roosevelt, New Orleans, La., October 3-5.

American Institute of Mining & Metallurgical Engineers, Petroleum Branch, fall meeting, Plaza Hotel, San Antonio, October 5-7.

American Society for Testing Materials, first Pacific area national meeting, Hotel Fairmont, San Francisco, October 10.

Texas Mid-Continent Oil and Gas Association, annual meeting, Rice Hotel, Houston, October 13-14.

American Gas Association, annual convention, Chicago, October 17-20.

American Institute of Mining & Metallurgical Engineers, Petroleum Branch, fall meeting, Elk's Club, Los Angeles, October 20-21.

Independent Natural Gas Association of America, annual meeting, Baker Hotel, Dallas, October 31.

November

American Petroleum Institute, annual meeting, Stevens Hotel, Chicago, November 7-10.

American Society of Mechanical Engineers, annual meeting, Hotel Statler, New York, November 27-December 2.

December

American Institute of Chemical Engineers, annual meeting, William Penn Hotel, Pittsburgh, Pa., December 4-7.

NOMADS

Houston Nomads, second Monday of each month, Ye Ole College Inn, Houston.

Los Angeles Nomads, second Wednesday each month, Jonathan Club.

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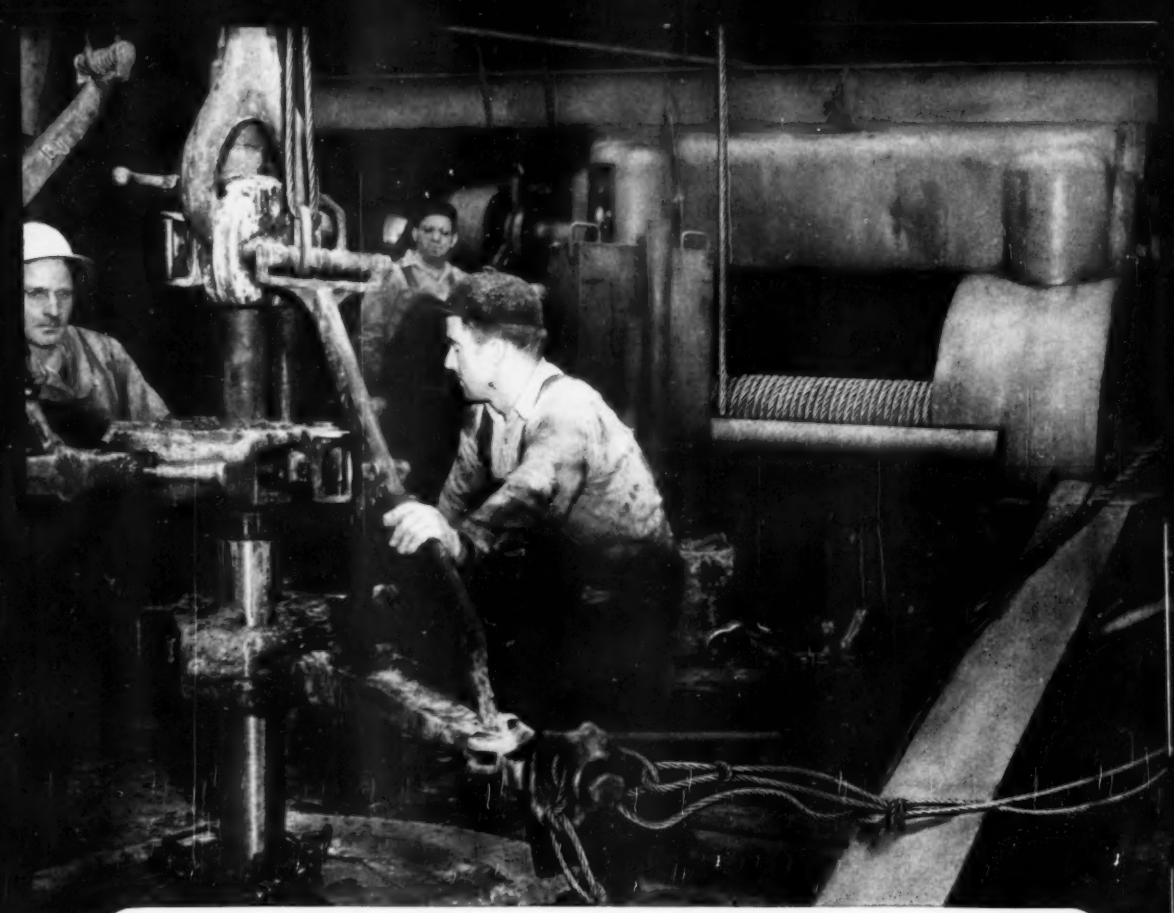

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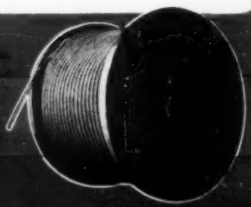

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